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THE
PUERPERAL STATE.

BEING PART THE FIFTH

FROM

A TREATISE ON THE SCIENCE AND PRACTICE OF MIDWIFERY.

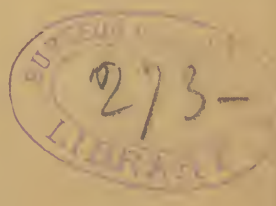
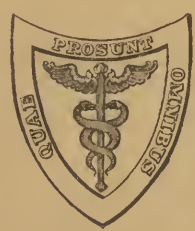
By W. S. PLAYFAIR, M.D., F.R.C.P.,

PHYSICIAN ACCOUCHEUR TO H. I. AND R. H. THE DUCHESS OF EDINBURGH; PROFESSOR OF OBSTETRIC
MEDICINE IN KING'S COLLEGE, LONDON, ETC.

WITH NOTES AND ADDITIONS

By ROBERT P. HARRIS, M.D.

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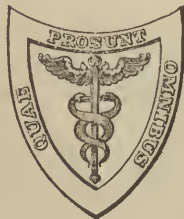
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THE PUERPERAL STATE.

CHAPTER I.

THE PUERPERAL STATE AND ITS MANAGEMENT.

Importance of Studying the Puerperal State.—The key to the management of women after labor, and to the proper understanding of the many important diseases which may then occur, is to be found in a study of the phenomena following delivery, and of the changes going on in the mother's system during the puerperal period. No doubt natural labor is a physiological and healthy function, and during recovery from its effects disease should not occur. It must not be forgotten, however, that none of our patients are under physiologically healthy conditions. The surroundings of the lying-in woman, the effects of civilization, of errors of diet, of defective cleanliness, of exposure to contagion, and of a hundred other conditions, which it is impossible to appreciate, have most important influences on the results of childbirth. Hence it follows that labor, even under the most favorable conditions, is attended with considerable risk.

The Mortality of Childbirth.—It is not easy to say with accuracy what is the precise mortality accompanying childbirth in ordinary domestic practice, since the returns derived from the reports of the Registrar-General, or from private sources, are manifestly open to serious error. The nearest approach to a reliable estimate is that made by Dr. Matthews Duncan,¹ who calculates from figures derived from various sources, that not fewer than 1 out of every 120 women, delivered at or near the full time, dies within four weeks of childbirth. This indicates a mortality far above that which has been generally believed to accompany child-bearing under favorable circumstances. It, however, closely approximates to a similar estimate made by McClintock,² who calculates the mortality in England and Wales as 1 in 126; and in the upper and middle classes alone, where the conditions may naturally be supposed to be more favorable, at 1 in 146; more recently he has come to the conclusion, from his own increased experience, and the published results of the practice of others, that 1 in 100 would more correctly represent the rate of puerperal mortality.³ In these calculations there are some obvious sources of error, since they include deaths from all causes within four weeks of delivery, some of which must have been independent of the puerperal state.

But it is not the deaths alone which should be considered. All practitioners know how large a number of their patients suffer from morbid states which may be directly traced to the effects of child-bearing. It is impossible to arrive at any statistical conclusion on this point, but, it must have a very sensible and important influence on the health of child-bearing women.

Alterations in the Blood after Delivery.—The state of the blood during pregnancy, already referred to, has an important bearing on the puerperal state. There is hyperinosis, which is largely increased by the changes going on immediately after the birth of the child: for then the large supply of blood, which has been going to the uterus, is suddenly stopped, and the system must also get rid of a quantity of effete matter thrown into the circulation, in consequence of the degenerative changes occurring in the muscular fibres of the uterus. Hence all the deparative channels, by which this can be eliminated, are called on to act with great activity. If, in addition, the peculiar condition of the generative tract be borne in mind—viz., the large open vessels on its inner surface—the partially bared inner surface of the uterus, and the channels for absorption existing in consequence of slight lacerations in the cervix or vagina—it is not a matter of surprise that septic diseases should be so common.

Condition after Delivery.—It will be well to consider successively the various changes

¹ The "Mortality of Childbed," Edin. Med. Journ., Nov., 1869.

² Dublin Quarterly Journ., Aug., 1869.

³ Brit. Med. Journ., Aug. 10, 1878.

going on after delivery, and then we shall be in a better position for studying the rational management of the puerperal state.

Nervous Shock.—Some degree of nervous shock or exhaustion is observable after most labors. In many cases it is entirely absent; in others it is well marked. Its amount is in proportion to the severity of the labor, and the susceptibility of the patient; and it is, therefore, most likely to be excessive in women who have suffered greatly from pain, who have undergone much muscular exertion, or who have been weakened from undue loss of blood. It is evidenced by a feeling of exhaustion and fatigue, and not uncommonly there is some shivering, which soon passes off, and is generally followed by refreshing sleep. The extreme nervous susceptibility continues for a considerable time after delivery, and indicates the necessity of keeping the lying-in patient as free from all sources of excitement as possible.

Fall of the Pulse.—Immediately after delivery the pulse falls, and the importance of this, as indicating a favorable state of the patient, has already been alluded to. The condition of the pulse has been carefully studied by Blot,¹ who has shown that this diminution, which he believes to be connected with an increased tension in the arteries, due to the sudden arrest of the uterine circulation, continues, in a large proportion of cases, for a considerable number of days after delivery; and, as a matter of clinical import, as long as it does, the patient may be considered to be in a favorable state. In many instances the slowness of the pulse is remarkable, often sinking to 50 or even 40 beats per minute. Any increase above the normal rate, especially if at all continuous, should always be carefully noted, and looked on with suspicion. In connection with this subject, however, it must be remembered that in puerperal women the most trivial circumstances may cause a sudden rise of the pulse. This must be familiar to every practical obstetrician, who has constant opportunities of observing this effect after any transient excitement or fatigue. In lying-in hospitals it has generally been observed that the occurrence of any particularly bad case will send up the pulse of all the other patients who may have heard of it.

Temperature in the Puerperal State.—The temperature in the lying-in state affords much valuable information. During, and for a short time after labor, there is a slight elevation. It soon falls to, or even somewhat below, the normal level. Squire found that the fall occurred within twenty-four hours, sometimes within twelve hours, after the termination of labor.² For a few days there is often a slight increase of temperature, which is probably caused by the rapid oxidation of tissue in connection with the involution of the uterus. In about forty-eight hours there is a rise connected with the establishment of lactation, amounting to one or two degrees over the normal level; but this again subsides as soon as the milk is freely secreted. Credé has also shown³ that rapid, but transient, rises of temperature may occur at any period, connected with trivial causes, such as constipation, errors of diet, or mental disturbances. But, if there be any rise of temperature which is at all continuous, especially to over 100° Fahr., and associated with rapidity of the pulse, there is reason to fear the existence of some complication.

The Secretions and Excretions.—The various secretions and excretions are carried on with increased activity after labor. The skin especially acts freely, the patient often sweating profusely. There is also an abundant secretion of urine, but not uncommonly a difficulty of voiding it, either on account of temporary paralysis of the neck of the bladder, resulting from the pressure to which it has been subjected, or from swelling and occlusion of the urethra. For the same reason the rectum is sluggish for a time, and constipation is not infrequent. The appetite is generally indifferent, and the patient is often thirsty.

Secretion of Milk.—Generally in about forty-eight hours the secretion of milk becomes established, and this is occasionally accompanied by a certain amount of constitutional irritation. The breasts often become turgid, hot, and painful. There may, or may not, be some general disturbance, quickening of pulse, elevation of temperature, possibly slight shivering, and a general sense of oppression, which are quickly relieved as the milk is formed, and the breasts emptied by suckling. Squire says that the most constant phenomenon connected with the temperature is a slight elevation as the milk is secreted, rapidly falling when lactation is established. Barker noted elevation, either of temperature or pulse, in only 4 out of 52 cases which were carefully watched. There can be little doubt that the importance of the so-called "milk fever" has been immensely exaggerated, and its existence, as a normal accompaniment of the puerperal state, is more than doubtful. It is certain, however, that, in a small minority of cases,

¹ Arch. Gén. de Méd., 1864.

² "Puerperal Temperatures," Obstetrical Transactions, vol. ix.

³ Monat. f. Geburt, Dec., 1868.

there is an appreciable amount of disturbance about the time that the milk is formed. Out of 423 cases Macan¹ found that in 114, or about 27 per cent., there was no rise of temperature; in 226 the temperature did rise to 100° and over, and of these in 32, or a little over 7 per cent., the only ascertainable cause was a painful or distended condition of the breast. Many modern writers, such as Winkel, Grünewaldt, and d'Espine, entirely deny the connection of this disturbance with lactation, and refer it to a slight and transient septicæmia. Graily Hewitt remarks that it is most commonly met with when the patient is kept low and on deficient diet after delivery, especially when the system is below par from hæmorrhage, or any other cause. This observation will, no doubt, account for the comparative rarity of febrile disturbance in connection with lactation in these days, in which the starving of puerperal patients is not considered necessary. It is certain that anything deserving the name of milk fever is now a together exceptional, and such feverishness as exists is generally quite transient. It is also a fact, that it is most apt to occur in delicate and weak women, especially in those who do not, or are unable to, nurse. There does not, however, seem to be any sufficient reason for referring it, even when tolerably well marked, to septicæmia. The relief which attends the emptying of the breasts seems sufficient to prove its connection with lactation, and the discomfort which is necessarily associated with the swollen and turgid mammae, is, of itself, quite sufficient to explain it.

In the urine of women during lactation an appreciable amount of sugar may readily be detected. The amount varies according to the condition of the breasts. It increases when they are turgid and congested, and is, therefore, most abundant in women in whom the breasts are not emptied, as when the child is dead, or when lactation is not attempted.

Contraction of the Uterus after Delivery.—Immediately after delivery the uterus contracts firmly, and can be felt at the lower part of the abdomen as a hard, firm mass, about the size of a cricket ball. After a time it again relaxes somewhat, and alternate relaxations and contractions go on, at intervals, for a considerable time after the expulsion of the placenta. The more complete and permanent the contraction, the greater the safety and comfort of the patient; for when the organ remains in a state of partial relaxation, coagula are apt to be retained in its cavity, while, for the same reason, air enters more readily into it. Hence decomposition is favored, and the chances of septic absorption are much increased; while, even when this does not occur, the muscular fibres are excited to contract, and severe after-pains are produced.

Subsequent Diminution in the Size of the Uterus.—After the first few days the diminution in the size of the uterus progresses with great rapidity. By about the sixth day it is so much lessened as to project not more than 1½ or 2 inches above the pelvic brim, while by the eleventh day it is no longer to be made out by abdominal palpation. Its increased size is, however, still apparent per vaginam, and, should occasion arise for making an internal examination, the mass of the lower segment of the uterus, with its flabby and patulous cervix, can be felt for some weeks after delivery. This may sometimes be of practical value in cases in which it is necessary to ascertain the fact of recent delivery, and, under these circumstances, as pointed out by Simpson, the uterine sound would also enable us to prove that the cavity of the uterus is considerably elongated. Indeed the normal condition of the uterus and cervix is not regained until six weeks or two months after labor. These observations are corroborated by investigations on the weight of the organ at different periods after labor. Thus Heschl² has shown that the uterus, immediately after delivery, weighs about 22 to 24 oz.; within a week, it weighs 19 to 21 oz.; and at the end of the second week, 10 to 11 oz. only. At the end of the third week, it weighs 5 to 7 oz.; but it is not until the end of the second month that it reaches its normal weight. Hence it appears that the most rapid diminution occurs during the second week after delivery.

Fatty Transformation of the Muscular Fibres.—The mode in which this diminution in size is effected is by the transformation of the muscular fibres into molecular fat, which is absorbed into the maternal vascular system, which, therefore, becomes loaded with a large amount of effete material. Heschl has shown that the entire mass of the enlarged uterine muscles are removed, and replaced by newly-formed fibres, which commence to be developed about the fourth week after delivery, the change being complete about the end of the second month. Generally speaking, involution goes on without interruption. It is, however, apt to be interfered with by a variety of causes, such as premature exertion, intercurrent disease, and, very probably, by neglect of lactation. Hence the uterus often remains large and bulky, and the foundation for many subsequent uterine ailments is laid.

¹ Dublin Journ. of Med. Science, May, 1878.

² Researches on the Conduct of the Human Uterus after Delivery.

Changes in the Uterine Vessels.—Williams has drawn attention to changes occurring in the vessels of the uterus, some of which seem to be permanent, and may, should further observations corroborate his investigations, prove of value in enabling us to ascertain whether a uterus is nulliparous or the reverse; a question which may be of medico-legal importance. After pregnancy he found all the vessels enlarged in calibre.

FIG. 1.



Section of a Uterine Sinus from the Placental Site, nine weeks after Delivery.
(After WILLIAMS.)

The coats of the arteries are thickened and hypertrophied, and this he has observed even in the uteri of aged women who have not borne children for many years. The venous sinuses, especially at the placental site, have their walls greatly thickened and convoluted, and contain in their centre a small clot of blood (Fig. 1). This thickening attains its greatest dimensions in the third month after gestation, but traces of it may be detected as late as ten or twelve weeks after labor.

Changes in the Uterine Mucous Membrane.—The changes going on in the lining membrane of the uterus immediately after delivery are of great importance in leading to a knowledge of the puerperal state. Its cavity is covered with a reddish-gray film, formed of blood and fibrine. The open mouths of the uterine sinuses are still visible, more especially over the site of the placenta, and thrombi may be seen projecting from them. The placental site can be distinctly made out, in the form of an irregularly oval patch, where the lining membrane is thicker than elsewhere.

Contraction of the Vagina, etc.—The vagina soon contracts, and, by the time the puerperal month is over, it has returned to its normal dimensions, but after child-bearing it always remains more lax, and less rugose than in nulliparæ. The vulva, at first very lax and much distended, soon regains its former state. The abdominal parietes remain loose and flabby for a considerable time, and the white streaks, produced by the distension of the cutis, very generally become permanent. In some women, especially when proper support by bandaging has not been given, the abdomen remains permanently loose and pendulous.

The Lochial Discharge.—From the time of delivery, up to about three weeks afterwards, a discharge escapes from the interior of the uterus, known as the *lochia*. At first this consists almost entirely of pure blood, mixed with a variable amount of coagula. If efficient uterine contraction have not been secured after the expulsion of the placenta, coagula of considerable size are frequently expelled with the lochia for one or two days after delivery. In three or four days the distinctly bloody character of the lochia is altered. They have a reddish watery appearance, and are known as

the *lochia rubra* or *cruenta*. According to the researches of Wertheimer,¹ they are at this time composed chiefly of blood corpuscles, mixed with epithelium scales, mucous corpuscles, and the débris of the decidua. The change in the appearance of the discharge progresses gradually, and about the seventh or eighth day it has no longer a red color, but is a pale greenish fluid, with a peculiar sickening and disagreeable odor, and is familiarly described as the "green waters." It now contains a smaller quantity of blood corpuscles, which lessen in amount from day to day, but a considerable number of pus corpuscles, which remain the principal constituent of the discharge until it ceases. Besides these, epithelial scales, fatty granules, and crystals of cholesterine, are observed. Occasionally a small infusorium, which has been named the "*trichomena vaginalis*," has been detected; but it is not of constant occurrence.

Variation in its Amount and Duration.—The amount of the lochia varies much, and in some women it is habitually more abundant than in others. Under ordinary circumstances it is very scanty after the first fortnight, but occasionally it continues somewhat abundant for a month or more, without any bad results. It is apt again to become of a red color, and to increase in quantity, in consequence of any slight excitement or disturbance. If this red discharge continue for any undue length of time, there is reason to suspect some abnormality, and it may not unfrequently be traced to slight lacerations about the cervix, which have not healed properly. This result may also follow premature exertion, interfering with the proper involution of the uterus; and the patient should certainly not be allowed to move about as long as much colored discharge is going on.

Occasional Fætor of the Discharge.—Occasionally the lochia have an intensely fetid odor. This must always give rise to some anxiety, since it often indicates the retention and putrefaction of coagula, and involves the risk of septic absorption. It is not very rare, however, to observe a most disagreeable odor persist in the lochia without any bad results. The fætor always deserves careful attention, and an endeavor should be made to obviate it by directing the nurse to syringe out the vagina freely night and morning with Condyl's fluid and water; while, if it be associated with quickened pulse and elevated temperature, other measures, to be subsequently described, will be necessary.

The after-pains, which many child-bearing women dread even more than the labor-pains, are irregular contractions, occurring for a varying time after delivery, and resulting from the efforts of the uterus to expel coagula which have formed in its interior. If, therefore, special care be taken to secure complete and permanent contraction after labor, they rarely occur, or to a very slight extent. Their dependence on uterine inertia is evidenced by the common observation that they are seldom met with in primiparæ, in whom uterine contraction may be supposed to be more efficient, and are most frequent in women who have borne many children. They are a preventible complication, and one which need not give rise to any anxiety; they are, indeed, rather salutary than the reverse, for if coagula be retained in utero, the sooner they are expelled the better. The after-pains generally begin a few hours after delivery, and continue, in bad cases, for three or four days, but seldom longer. They are generally increased when the mammæ are irritated by suction. When at their height they are often relieved by the expulsion of the coagula. In some severe cases they are apparently neuralgic in character, and do not seem to depend on the retention of coagula. They may be readily distinguished from pains due to more serious causes, by feeling the enlarged uterus harden under their influence, by the uterus not being tender on pressure, and by the absence of any constitutional symptoms.

Management of Women after Delivery.—The management of women after child-birth has varied much at different times, according to fashion or theory. The dread of inflammation long influenced the professional mind, and caused the adoption of a strictly antiphlogistic diet, which led to a tardy convalescence. The recognition of the essentially physiological character of labor has resulted in more sound views, with manifest advantage to our patients. The main facts to bear in mind with regard to the puerperal woman are, her nervous susceptibility, which necessitates quiet and absence of all excitement; the importance of favoring involution by prolonged rest; and the risk of septicæmia, which calls for perfect cleanliness and attention to hygienic precautions.

The Administration of Opiates is generally Unadvisable.—As soon as we are satisfied that the uterus is perfectly contracted, and that all risk of hæmorrhage is over, the patient should be left to sleep. Many practitioners administer an opiate; but, as a matter of routine, this is certainly not good practice, since it checks the contractions of

the uterus, and often produces unpleasant effects. Still, if the labor have been long and tedious, and the patient be much exhausted, 15 or 20 drops of Battley's solution may be administered with advantage.

Attention to the State of the Pulse, Bladder, and Uterus.—Within a few hours the patient should be seen, and at the first visit particular attention should be paid to the state of the pulse, the uterus, and the bladder. The pulse during the whole period of convalescence should be carefully watched, and, if it be at all elevated, the temperature should at once be taken. If the pulse and temperature remain normal, we may be satisfied that things are going on well; but if the one be quickened and the other elevated, some disturbance or complication may be apprehended. The abdomen should be felt to see that the uterus is not unduly distended, and that there is no tenderness. After the first day or two this is no longer necessary.

Treatment of Retention of Urine.—Sometimes the patient cannot at first void the urine, and the application of a hot sponge over the pubis may enable her to do so. If the retention of urine be due to temporary paralysis of the bladder, three or four 20-minim doses of the liquid extract of ergot, at intervals of half an hour, may prove successful. Many hours should not be allowed to elapse without relieving the patient by the catheter, since prolonged retention is only likely to make matters worse. Subsequently, it may be necessary to empty the bladder night and morning, until the patient regain her power over it, or until the swelling of the urethra subsides, and this will generally be the case in a few days. Occasionally the bladder becomes largely distended, and is relieved to some degree by dribbling of urine from the urethra. Such a state of things may deceive the patient and nurse, and may produce serious consequences by causing cystitis. Attention to the condition of the abdomen will prevent the practitioner from being deceived, for in addition to some constitutional disturbance, a large, tender, and fluctuating swelling will be found in the hypogastric region, distinct from the uterus, which it displaces to one or other side. The catheter will at once prove that this is produced by distension of the bladder.

Treatment of Severe After-pains.—If the after-pains be very severe, an opiate may be administered, or, if the lochia be not over-abundant, a linseed-meal poultice, sprinkled with laudanum, or with the chloroform and belladonna liniment, may be applied. If proper care have been taken to induce uterine contraction, they will seldom be sufficiently severe to require treatment. In America, quinine in doses of 10 grains twice daily, has been strongly recommended, especially when opiates fail, and when the pains are neuralgic in character, and I have found this remedy answer extremely well. The quinine is best given in solution with 10 or 15 minims of hydrobromic acid, which materially lessens the unpleasant head symptoms often accompanying the administration of such large doses.

Diet and Regimen.—The diet of the puerperal patient claims careful attention, the more so as old prejudices in this respect are as yet far from exploded, and as it is by no means rare to find mothers and nurses who still cling tenaciously to the idea that it is essential to prescribe a low regimen for many days after labor. The erroneousness of this plan is now so thoroughly recognized, that it is hardly necessary to argue the point. There is, however, a tendency in some to err in the opposite direction, which leads them to insist on the patient's consuming solid food too soon after delivery, before she has regained her appetite, thereby producing nausea and intestinal derangement. Our best guide in this matter is the feelings of the patient herself. If, as is often the case, she be disinclined to eat, there is no reason why she should be urged to do so. A good cup of beef-tea, some bread and milk, or an egg beat up with milk, may generally be given with advantage shortly after delivery, and many patients are not inclined to take more for the first day or so. If the patient be hungry there is no reason why she should not have some more solid, but easily digested food, such as white fish, chicken, or sweet-bread; and, after a day or two, she may resume her ordinary diet, bearing in mind that, being confined to bed, she cannot with advantage consume the same amount of solid food as when she is up and about. Dr. Oldham, in his presidential address to the Obstetrical Society,¹ has some apposite remarks on this point, which are worthy of quotation. "A puerperal month under the guidance of a monthly nurse is easily drawn out, and it is well if a love of the comforts of illness and the persuasion of being delicate, which are the infirmities of many women, do not induce a feeble life, which long survives after the occasion of it is forgotten. I know no reason why, if a woman is confined early in the morning, she should not have her breakfast of tea and toast at nine, her luncheon of some digestible meat at one, her cup of tea at five, her dinner with chicken at seven, and her tea again at nine, or the equivalent, according to the

¹ *Obstet. Trans.*, vol. vi.

variation of her habits of living." [The practice in general in the United States has been to avoid the use of stimulating food for two or three days after delivery, on the same principle that low diet is used in the different forms of abdominal surgery. Full diet and animal food might possibly answer in many of our cases without risk; and beef essence, we know, is of much value after hæmorrhage, but in healthy, vigorous subjects I see no occasion to ignore the teaching of the past, when based upon sound reasoning. I believe in dieting the robust, and feeding up the delicate. By "dieting" I do not mean the old starvation system; but plain, simple, nutritious food.—ED.] "Of course, there is the common-sense selection of articles of food, guarding against excess, and avoiding stimulants. But gruel and slops, and all intermediate feeding are to be avoided." No one who has seen both methods adopted can fail to have been struck with the more rapid and satisfactory convalescence which takes place when the patient's strength is not weakened by an unnecessarily low diet. Stimulants, as a rule, are not required; but, if the patient be weakly and exhausted, or if she be accustomed to their use, there can be no reasonable objection to their judicious administration.

Attention to Cleanliness, etc.—Immediately after delivery a warm napkin is applied to the vulva, and, after the patient has rested a little, the nurse removes the soiled linen from the bed, and washes the external genitals. It is impossible to pay too much attention during the subsequent progress of the case to the maintenance of perfect cleanliness. Perfectly antiseptic midwifery is no doubt an impossibility; but a near approach to it may be made, and the greater the care taken, the more certainly will the safety of the patient be insured. It will be a wise precaution to advise the nurse never to touch the genitals for the first few days, unless her hands have been moistened in a 1 in 20 solution of carbolic acid, or lubricated with carbolized oil. The linen should be frequently changed, and all dirty linen and discharges immediately removed from the apartment. The vulva should be washed daily with Condy's fluid and water, and the patient will derive great comfort from having the vagina syringed gently out once a day with the same solution. The remarkable diminution of mortality which has followed such antiseptic precautions in certain Lying-in Hospitals in Germany, well shows the importance of these measures. The room should be kept tolerably cool, and fresh air freely admitted.

Action of the Bowels.—It is customary on the morning of the second or third day, to secure an action of the bowels; and there is no better way of doing this than by a large enema of soap and water. If the patient object to this, and the bowels have not acted, some mild aperient may be administered, such as a small dose of castor oil, a few grains of colocynth and henbane pill, or the popular French aperient, the "Tamar Indien."

Lactation.—The management of the suckling and of the breasts forms an important part of the duties of the monthly nurse, which the practitioner should himself superintend. This will be more conveniently discussed under the head of lactation.

Importance of Prolonged Rest.—The most important part of the management of the puerperal state is the securing to the patient prolonged rest in the horizontal position, in order to favor proper involution of the uterus. For the first few days she should be kept as quiet and still as possible, not receiving the visits of any but her nearest relatives, thus avoiding all chance of undue excitement. It is customary among the better classes for the patient to remain in bed for eight or ten days; but, provided she be doing well, there can be no objection to her lying on the outside of the bed, or slipping on to a sofa, somewhat sooner. After ten days or a fortnight she may be permitted to sit on a chair for a little; but I am convinced that the longer she can be persuaded to retain the recumbent position, the more complete and satisfactory will be the progress of involution, and she should not be allowed to walk about until the third week, about which time she may also be permitted to take a drive. If it be borne in mind that it takes from six weeks to two months for the uterus to regain its natural size, the reason for prolonged rest will be obvious. The judicious practitioner, however, while insisting on this point, will take measures at the same time, not to allow the patient to lapse into the habit of an invalid, or to give the necessary rest the semblance of disease.

Subsequent Treatment.—Towards the termination of the puerperal months some slight tonic, such as small doses of quinine with phosphoric acid, may be often given with advantage, especially if convalescence be tardy. Nothing is so beneficial in restoring the patient to her usual health as change of air, and in the upper classes a short visit to the seaside may generally be recommended, with the certainty of much benefit.

CHAPTER II.

MANAGEMENT OF THE INFANT, LACTATION, ETC.

Commencement of Respiration.—Almost immediately after its expulsion, a healthy child cries aloud, thereby showing that respiration is established, and this may be taken as a signal of its safety. The first respiratory movements are excited, partially by reflex action resulting from the contact of the cold external air on the cutaneous nerves, and partly by the direct irritation of the medulla oblongata, in consequence of the circulation through it of blood no longer oxygenated in the placenta.

Apparent Death of the New-born Child.—Not infrequently the child is born in an apparently lifeless state. This is especially likely to be the case when the second stage of labor has been unduly prolonged, so that the head has been subjected to long-continued pressure. The utero-placental circulation is also apt to be injuriously interfered with before the birth of the child when a tardy labor has produced tonic contraction of the uterus, and consequent closure of the uterine sinuses; or, more rarely, from such causes as the injudicious administration of ergot, premature separation of the placenta, or compression of the umbilical cord. In any of these cases it is probable that the arrest of the utero-placental circulation induces attempts at inspiration, which are necessarily fruitless, since air cannot reach the lungs, and the fœtus may die asphyxiated; the existence of the respiratory movement being proved on post-mortem examination by the presence in the lungs of liquor amnii, mucus, and meconium, and by the extravasation of blood from the rupture of their engorged vessels.

Appearance of the Child in such Cases.—In most cases, when the child is born in a state of apparent asphyxia, its face is swollen and of a dark livid color. It not infrequently makes one or two feeble and gasping efforts at respiration, without any definite cry; on auscultation the heart may be heard to beat weakly and slowly. Under such circumstances there is a fair hope of its recovery. In other cases the child, instead of being turgid and livid in the face, is pale, with flaccid limbs, and no appreciable cardiac action, then the prognosis is much more unfavorable.

Treatment of Apparent Death.—No time should be lost in endeavoring to excite respiration, and, at first, this must be done by applying suitable stimulants to the cutaneous nerves, in the hope of exciting reflex action. The cord should be at once tied, and the child removed from the mother; for the final uterine contractions have so completely arrested the utero-placental circulation, as to render it no longer of any value. If the face be very livid, a few drops of blood may with advantage be allowed to flow from the cord before it is tied, with the view of relieving the embarrassed circulation. Very often some slight stimulus, such as one or two sharp slaps on the thorax, or rapidly rubbing the body with brandy poured into the palms of the hands, will suffice to induce respiration. Failing this, nothing acts so well as the sudden and instantaneous application of heat and cold. For this purpose extremely hot water is placed in one basin, and quite cold water in another. Taking the child by the shoulders and legs, it should be dipped for a single moment into the hot water, and then into the cold; and these alternate applications may be repeated once or twice, as occasion requires. The effect of this measure is often very marked, and I have frequently seen it succeed when prolonged efforts at artificial respiration had been made in vain.

Artificial Respiration.—If these means fail, an endeavor must be at once made to carry on respiration artificially. The Sylvester method is, on the whole, that which is most easily applied, and, on account of the compressibility of the thorax, it is peculiarly suitable for infants. The child being laid on its back, with the shoulders slightly elevated, the elbows are grasped by the operator, and alternately raised above the head, and slowly depressed against the sides of the thorax, so as to produce the effect of inspiration and expiration. If this do not succeed, the Marshall Hall method may be substituted; and one or more of the plans of exciting reflex action through the cutaneous nerves may be alternated with it.

Insufflation of the Lungs.—Other means of exciting respiration have been recommended. One of them, much used abroad, is the artificial insufflation of the lungs by means of a flexible catheter guided into the glottis. It is not difficult to pass the end of a catheter into the glottis, using the little finger as a guide; and once in position, it may be used to blow air gently into the lungs, which is expelled by compression on the

thorax, the insufflation being repeated at short intervals of about ten seconds. One advantage of this plan is, that it allows the liquor amnii and other fluids, which may have been drawn into the lungs in the premature efforts at respiration before birth, to be sucked up into the catheter, and so removed from the lungs. The same effect may be produced, but less perfectly, by placing the hand over the nostrils of the child, blowing into its mouth, and immediately afterwards compressing the thorax.¹ One of these methods should certainly be tried, if all other means have failed. Faradization along the course of the phrenic nerves is a promising means of inducing respiration, which should be used if the proper apparatus can be procured. Encouragement to persevere in our endeavors to resuscitate the child may be derived from the numerous authenticated instances of success after the lapse of a considerable time, even of an hour or more. As long as the cardiac pulsations continue, however feebly, there is no reason to despair.

Washing and Dressing of the Child.—When the child cries lustily from the first, it is customary for the nurse to wash and dress it as soon as her immediate attendance on the mother is no longer required. For this purpose it is placed in a bath of warm water, and carefully soaped and sponged from head to foot. With the view of facilitating the removal of the unctuous material with which it is covered, it is usual to anoint it with cold cream or olive oil, which is washed off in the bath. Nurses are apt to use undue roughness in endeavoring to remove every particle of the vernix caseosa, small portions of which are often firmly adherent. This mistake should be avoided, as these particles will soon dry up and become spontaneously detached. The cord is generally wrapped in a small piece of charred linen, which is supposed to have some slight antiseptic property, and this is renewed from day to day until the cord has withered and separated. This generally occurs within a week; and a small pad of soft linen is then placed over the umbilicus, and supported by a flannel belly-band, placed round the abdomen, which should not be too tight, for fear of embarrassing the respiration. By this means the tendency to umbilical hernia is prevented. [As the vernix caseosa is readily miscible with pure lard, and can be easily removed by its means, it has become the practice with many obstetricians in the United States to order the infant to be well anointed and then wiped from head to foot with soft rags, until all the vernix disappears and the skin retains a slight oily trace, not enough to soil the clothing. By this means water is avoided, and with it much of the risk of taking cold; and the skin is left less sensitive after the sudden change which it is made to endure at birth than when subjected to hot water and soap. In the hot months water is preferable at the first dressing.—ED.]

Clothing, etc.—The clothing of the infant varies according to fashion and the circumstances of the parents. The important points to bear in mind are that it should be warm (since newly-born children are extremely susceptible to cold), and at the same time light and sufficiently loose to allow free play to the limbs and thorax. All tight bandaging and swaddling, such as is so common in some parts of the Continent, should be avoided, and the clothes should be fastened by strings or by sewing, and no pins used. At the present day it is customary not to use caps, so that the head may be kept cool. The utmost possible attention should be paid to cleanliness, and the child should be regularly bathed in tepid water, at first once daily, and after the first few weeks both night and morning. After drying, the flexures of the thighs and arms, and the nates, should be dusted with violet powder or Fuller's earth, to prevent chafing of the skin. The excrements should be received in napkins wrapped round the hips, and great care is required to change the napkins as often as they are wet or soiled, otherwise troublesome irritation will arise. A neglect of this precaution, and the washing of the napkins with coarse soap or soda, are among the principal causes of the eruptions and excoriations so common in badly cared for children. When washed and dressed the child may be placed in its cradle, and covered with soft blankets or an eider-down quilt.

Application of the Child to the Breast.—As soon as the mother has rested a little, it is advisable to place the child to the breast. This is useful to the mother by favoring uterine contraction. Even now there is in the breasts a variable quantity of the peculiar fluid known as *colostrum*. This is a viscid yellowish secretion, different in appearance from the thin bluish milk which is subsequently formed. Examined under the microscope it is found to contain some milk globules, a number of large granular and small fat corpuscles. It has a purgative property, and soon produces with less irritation than any of the laxatives so generally used, a discharge of the meconium with which

[¹ When this is done the œsophagus must be closed by placing the thumb and fingers on opposite sides of the larynx, and pressing it backward, just before blowing in the mouth. When this is accomplished so as to fill the lungs, the thorax should be pressed, and the inflation repeated.—ED.]

the bowels are loaded. Hence the accoucheur should prohibit the common practice of administering castor oil, or other aperient, within the first few days after birth, although there can be no objection to it, in special cases, if the bowels appear to act inefficiently and with difficulty.

Over-frequent Suckling should be Avoided.—For the first few days, and until the secretion of milk is thoroughly established, the child should be put to the breast at long intervals only. Constant attempts at suckling an empty breast lead to nothing but disappointment, both to the mother and child, and by unduly irritating the mammae, sometimes to positive harm. Therefore, for the first day or two, it is sufficient if the child be applied to the breast twice, or at most three times, in the twenty-four hours. Nor is it necessary to be apprehensive, as many mothers naturally are, that the child will suffer from want of food. A few spoonfuls of milk and water being given from time to time, the child may generally wait without injury until the milk is secreted. This is generally about the third day, when the secretion is found to be a whitish fluid, more watery in appearance than cow's milk, and showing under the microscope an abundance of minute spherical globules, refracting light strongly, which are abundant in proportion to the quality of the milk. A certain number of granular corpuscles may also be observed shortly after the birth of the child, but after the first month, these should have almost altogether disappeared. The reaction of human milk is decidedly alkaline, and the taste much sweeter than that of cow's milk.

Importance of Nursing when Practicable.—The importance to the mother of nursing her own child, whenever her health permits, on account of the favorable influence of lactation in promoting a proper involution of the uterus, has already been insisted on. Unless there be some positive contra-indication, such as a marked strumous cachexia, an hereditary phthisical tendency, or great general debility, it is the duty of the accoucheur to urge the mother to attempt lactation, even if it be not carried on more than a month or two. It is, however, the fact that in the upper classes of society a large number of patients are unable to nurse, even though willing and anxious to do so. In some there is hardly any lacteal secretion at all, in others there is at first an over-abundance of watery and innutritious milk, which floods the breasts, and soon dies away altogether.

When the Mother cannot Nurse a Wet Nurse should be Procured.—Whenever the mother cannot or will not nurse, the question will arise as to the method of bringing up the child. From many causes there is an increasing tendency to resort to bottle-feeding, instead of procuring the services of a wet nurse, even when the question of expense does not come into consideration. No long experience is required to prove that hand-feeding is a bad and imperfect substitute for nature's mode, and one which the practitioner should discourage whenever it lies in his power to do so. It is true that, in many cases, bottle-fed children do well; but there is good reason to believe that, even when apparently most successful, the children are not so strong in after-life as they would have been had they been brought up at the breast. When, in addition, it is borne in mind how much of the success of hand-feeding depends on intelligent care on the part of the nurse, what evils are apt to accrue from injurious selection of food, and from ignorance of the commonest laws of dietetics, there is abundant reason for urging the substitution of a wet nurse, whenever the mother is unable to undertake the suckling of her child. It must be admitted that good hand-feeding is better than bad wet-nursing, and the success of the latter hinges on the proper selection of a wet nurse. As this falls within the duties of the practitioner, it will be well to point out the qualities which should be sought for in a wet nurse, before proceeding to discuss the mode of rearing the child at the breast.

Selection of a Wet Nurse.—In selecting a wet nurse, we should endeavor to choose a strong, healthy woman, who should not be over 30, or 35 years of age at the outside, since the quality of the milk deteriorates in women who are more advanced in life. For a similar reason a very young woman of 16 or 17 should be rejected. It is needless to say that care must be taken to ascertain the absence of all traces of constitutional disease, especially marks of scrofula, or enlarged cervical or inguinal glands, which may possibly be due to antecedent syphilitic taint. If the nurse be of good muscular development, healthy-looking, with a clear complexion, and sound teeth (indicating a generally good state of health), the color of the hair and eyes is of secondary importance. It is commonly stated that brunettes make better nurses than blondes, but this is by no means necessarily the case; and, provided all the other points be favorable, fairness of skin and hair need be no bar to the selection of a nurse. The breasts should be pear-shaped, rather firm, as indicating an abundance of gland-tissue, and with the superficial veins well marked. Large, flabby breasts owe much of their size to an undue deposit of fat, and are generally unfavorable. The nipple should be prom-

inent, not too large, and free from cracks and erosions, which, if existing, might lead to subsequent difficulties in nursing. On pressing the breast the milk should flow from it easily in a number of small jets, and some of it should be preserved for examination. It should be of a bluish-white color, and when placed under the microscope, the field should be covered with an abundance of milk corpuscles, and the large granular corpuscles of the colostrum should have entirely disappeared. If the latter be observed in any quantity in a woman who has been confined five or six weeks, the inference is that the milk is inferior in quality. It is not often that the practitioner has an opportunity of inquiring into the moral qualities of the nurse, although much valuable information might be derived from a knowledge of her previous character. An irascible, excitable, or highly nervous woman will certainly make a bad nurse, and the most trivial causes might afterwards interfere with the quality of her milk. Particular attention should be paid to the nurse's own child, since its condition affords the best criterion of the quality of her milk. It should be plump, well nourished, and free from all blemishes. If it be at all thin and wizened, especially if there be any snuffling at the nose, or should any eruption exist affording the slightest suspicion of a syphilitic taint, the nurse should be unhesitatingly rejected.

Management of Suckling.—The management of suckling is much the same whether the child is nursed by the mother or by a wet nurse. As soon as the supply of milk is sufficiently established, the child must be put to the breast at short intervals, at first of about two hours, and, in about a month or six weeks, of three hours. From the first few days it is a matter of the greatest importance, both to the mother and child, to acquire regular habits in this respect. If the mother get into the way of allowing the infant to take the breast whenever it cries, as a means of keeping it quiet, her own health must soon suffer, to say nothing of the discomfort of being incessantly tied to the child's side: while the child itself has not sufficient rest to digest its food, and, very shortly, diarrhœa, or other symptoms of dyspepsia, are pretty sure to follow. After a month or two the infant should be trained to require the breast less often at night, so as to enable the mother to have an undisturbed sleep of six or seven hours. For this purpose she should arrange the times of nursing so as to give the breast just before she goes to bed, and not again until the early morning. If the child should require food in the interval, a little milk and water, from the bottle, may be advantageously given.

Diet of Nursing Women.—The diet of the nursing woman should be arranged on ordinary principles of hygiene. It should be abundant, simple, and nutritious, and all rich and stimulating articles of food should be avoided. A common error in the diet of wet nurses is over-feeding, which constantly leads to deterioration of the milk. Many of these women, before entering on their functions, have been living on the simplest and even sparest diet, and not uncommonly, in the better class of houses, they are suddenly given heavy meat meals three and even four times a day, and often three or four glasses of stout. It is hardly a matter of astonishment that, under such circumstances, their milk should be found to disagree. For a nursing woman in good health, two good meat meals a day, with two glasses of beer or porter, and as much milk and bread and butter as she likes to take in the interval, should be amply sufficient. Plenty of moderate exercise should be taken, and the more nurse and child are out in the open air, provided the weather be reasonably fine, the better it is for both.

[As it is not the custom of American wet nurses to drink beer or stout, this part of their diet is undesirable. A healthy woman should have milk enough from her ordinary diet, which should be largely farinaceous. If milk agrees with her, it is far better than malt drinks in the production of a lacteal supply.—ED.]

Signs of Successful Lactation.—Carried on methodically in this manner, wet nursing should give but little trouble. In the intervals between its meals the child sleeps most of its time, and wakes with regularity to feed; but if the child be wakeful and restless, cry after feeding, have disordered bowels, and, above all, if it do not gain week by week, in weight (a point which should be, from time to time, ascertained by the scales), we may conclude that there is either some grave defect in the management of suckling, or that the milk is not agreeing. Should this unsatisfactory progress continue, in spite of our endeavors to remedy it, there is no resource left but the alteration of the diet, either by changing the nurse, or by bringing up the child by hand. The former should be preferred whenever it is practicable, and, in the upper ranks of life, it is by no means rare to have to change the wet nurse two or three times, before one is met with whose milk agrees perfectly. If the child have reached six or seven months of age, it may be preferable to wean it altogether, especially if the mother have nursed it, as hand-feeding is much less objectionable if the infant have had the breast for even a few months.

Period of Weaning.—As a rule, weaning should not be attempted until dentition is

fairly established, that being the sign that nature has prepared the child for an alteration of food; and it is better that the main portion of the diet should be breast milk until at least six or seven teeth have appeared. This is a safer guide than any arbitrary rule taken from the age of the child, since the commencement of dentition varies much in different cases. About the sixth or seventh month it is a good plan to commence the use of some suitable artificial food once a day, so as to relieve the strain on the mother or nurse, and prepare the child for weaning, which should always be a very gradual process. In this way a meal of rusks, of the entire wheat flour, or of beef- or chicken-tea, with bread crumb in it, may be given with advantage; and, as the period for weaning arrives, a second meal may be added, and so eventually the child may be weaned without distress to itself, or trouble to the nurse.

The Disorders of Lactation.—The disorders of lactation are numerous, and, as they frequently come under the notice of the practitioner, it is necessary to allude to some of the most common and important.

Means of Arresting the Secretion of Milk.—The advice of the accoucheur is often required in cases in which it has been determined that the patient is not to nurse, when we desire to get rid of the milk as soon as possible, or when, at the time of weaning, the same object is sought. The extreme heat and distention of the breasts, in the former class of cases, often give rise to much distress. A smart saline aperient will aid in removing the milk, and for this purpose a double Scidlitz powder, or frequent small doses of sulphate of magnesia, act well; while, at the same time, the patient should be advised to take as small a quantity of fluid as possible. Iodide of potassium in large doses, of 20 or 25 grains, repeated twice or thrice, has a remarkable effect in arresting the secretion of milk. This observation was first empirically made by observing that the secretion of milk was arrested when this drug was administered for some other cause, and I have frequently found it answer remarkably well. The distention of the breasts is best relieved by covering them with a layer of lint or cotton wool, soaked in a spirit lotion, or eau de cologne and water, over which oiled silk is placed, and by directing the nurse to rub them gently with warm oil, whenever they get hard and lumpy. Breast-pumps and similar contrivances only irritate the breasts, and do more harm than good. The local application of belladonna has been strongly recommended as a means for preventing lacteal secretion. As usually applied, in the form of belladonna plaster, it is likely to prove hurtful, since the breast often enlarges after the plasters are applied, and the pressure of the unyielding leather on which they are spread produces intense suffering. A better way of using it is by rubbing down a drachm of the extract of belladonna with an ounce of glycerin, and applying this on lint. In some cases it answers extremely well; but it is very uncertain in its action, and frequently is quite useless.

Defective Secretion of Milk.—A deficiency of milk in nursing mothers is a very common source of difficulty. In a wet nurse this drawback is, of course, an indication for changing the nurse; but to the mother the importance of nursing is so great, that an endeavor must be made either to increase the flow of milk, or to supplement it by other food. Unfortunately, little reliance can be placed on any of the so-called galactagogues. The only one which in recent times has attracted attention is the leaves of the castor-oil plant, which, made into pulvices and applied to the breast, are said to have a beneficial effect in increasing the flow of milk. More reliance must be placed in a sufficiency of nutritious food, especially such as contains phosphatic elements; stewed eels, oysters, and other kinds of shellfish, and the *Revalentia Arabica*, are recommended by Dr. Routh, who has paid some attention to this point,¹ as peculiarly appropriate. If the amount of milk be decidedly deficient, the child should be less often applied to the breast, so as to allow milk to collect, and properly prepared cow's milk from a bottle should be given alternately with the breast. This mixed diet generally answers well, and is far preferable to pure hand-feeding.

[In the year 1870,² I prepared an article showing by three typical cases the value of milk as a diet for certain delicate mothers, who, under their ordinary food, invariably fail to be able to nurse longer than a few weeks or months after parturition. This paper was published by various periodicals during two years, and the plan has been brought largely into use, as the diet is capable of making a good nurse out of a mother, who but for it would make a complete failure, and of fattening her up during the time that she is secreting milk in abundance. When a delicate mother of 86 pounds weight, after failing in a month with each of three infants, is enabled by it to nurse a child 18 months, and gain at the same time 19 pounds, the diet must be an effective one.—ED.]

¹ Routh on Infant-feeding.

² Am. Journ. Obstet., Feb., 1870, p. 675.]

Depressed Nipples.—A not uncommon source of difficulty is a depressed condition of the nipples, which is generally produced by the constant pressure of the stays. The result is, that the child, unable to grasp the nipple, and wearied with ineffectual efforts, may at last refuse the breast altogether. An endeavor should be made to elongate the nipple before putting it into the child's mouth, either by the fingers, or by some form of breast-pump, which here finds a useful indication. In the worst class of cases, when the nipple is permanently depressed, it may be necessary to let the child suck through a glass nipple shield, to which is attached an India-rubber tube, similar to that of a sucking-bottle; that it is generally well able to do.

[In some instances this anatomical defect appears to be beyond remedy, unless a recently proposed surgical operation can be made effective. I have tried to prepare primiparæ for several months before labor, and then failed as soon as the breasts filled with milk. In some cases there is absolutely no nipple, and as a shield is of no value in protection, the escaping milk produces an eczema over the waist and upper part of the abdomen. This condition I have seen associated with a most obstinate galactorrhœa lasting several months.—Ed.]

Fissures and excoriations of the nipples are common causes of suffering, in some cases leading to mammary abscess. Whenever the practitioner has the opportunity, he should advise his patient to prepare the nipple for nursing in the latter months of pregnancy; and this may best be done by daily bathing it with a spirituous or astringent lotion, such as eau de cologne and water, or a weak solution of tannin. After nursing has begun, great care should be taken to wash and dry the nipple after the child has been applied to it, and, as long as the mother is in the recumbent position, she may, if the nipples be at all tender, use zinc nipple-shields with advantage, when she is not nursing. In this way these troublesome complications may generally be prevented. The most common forms are either an abrasion on the surface of the nipple, which, if neglected, may form a small ulcer, or a crack at some part of the nipple, most generally at its base. In either case, the suffering when the child is put to the breast is intense, sometimes indeed amounting to intolerable anguish, causing the mother to look forward with dread to the application of the child. Whenever such pain is complained of, the nipple should be carefully examined, since the fissure or sore is often so minute as to escape superficial examination. The remedies recommended are very numerous, and not always successful. Amongst those most commonly used are astringent applications, such as tannin, or weak solutions of nitrate of silver, or cauterizing the edges of the fissure with the solid nitrate of silver, or applying the flexible collodion of the Pharmacopœia. Dr. Wilson, of Glasgow, speaks highly of a lotion composed of ten grains of nitrate of lead in an ounce of glycerin, which is to be applied after suckling, the nipple being carefully washed before the child is again put to the breast. I have myself found nothing answer so well as a lotion composed of half an ounce of sulphurous acid, half an ounce of the glycerin of tannin, and an ounce of water, the beneficial effects of which are sometimes quite remarkable. Relief may occasionally be obtained by inducing the child to suck through a nipple-shield, especially when there is only an excoriation; but this will not always answer, on account of the extreme pain which it produces.

Excessive Flow of Milk.—An excessive flow of milk, known as *galactorrhœa*, often interferes with successful lactation. It is by no means rare in the first weeks after delivery for women of delicate constitution, who are really unfit to nurse, to be flooded with a superabundance of watery and innutritious milk, which soon produces disordered digestion in the child. Under such circumstances, the only thing to be done is to give up an attempt which is injurious both to the mother and child. At a later stage the milk, secreted in large quantities, is sufficiently nourishing to the child, but the drain on the mother's constitution soon begins to tell on her. Palpitation, giddiness, emaciation, headache, loss of sleep, spots before the eyes, and even amaurosis, indicate the serious effects which are being produced, and the absolute necessity of at once stopping lactation. Whenever, therefore, a nursing woman suffers from such symptoms, it is far better at once to remove the cause, otherwise a very serious and permanent deterioration of health might result.

Mammary Abscess.—There is no more troublesome complication of lactation than the formation of abscess in the breast; an occurrence by no means rare, and which, if improperly treated, may, by long-continued suppuration and the formation of numerous sinuses in and about the breast, produce very serious effects on the general health. The causes of breast abscesses are numerous, and very trivial circumstances may occasionally set up inflammation, ending in suppuration. Thus it may follow exposure to cold; a blow, or other injury to the breast; some temporary engorgement of the lacteal tubes; or even sudden or depressing mental emotions. The most frequent cause

is irritation from fissures or erosions of the nipples, which must, therefore, always be regarded with suspicion, and cured as soon as possible.

Signs and Symptoms.—The abscess may form in any part of the breast, or in the areolar tissue below it; in the latter case, the inflammation very generally extends to the gland structure. Abscess is usually ushered in by constitutional symptoms, varying in severity with the amount of the inflammation. Pyrexia is always present; elevated temperature, rapid pulse, and much malaise and sense of feverishness, followed, in many cases, by distinct rigor, when deep-seated suppuration is taking place. On examining the breast it will be found to be generally enlarged and very tender, while, at the site of the abscess, an indurated and painful swelling may be felt. If the inflammation be chiefly limited to the subglandular areolar tissue, there may be no localized swelling felt, but the whole breast will be acutely sensitive, and the slightest movement will cause much pain. As the case progresses, the abscess becomes more and more superficial, the skin covering it is red and glazed, and if left to itself, it bursts. In the more serious cases, it is by no means rare for multiple abscesses to form. These opening, one after the other, lead to the formation of numerous fistulous tracts, by which the breast may become completely riddled. Sloughing of portions of the gland-tissue may take place, and even considerable hæmorrhage, from the destruction of blood-vessels. The general health soon suffers to a marked degree, and, as the sinuses continue to suppurate for many successive months, it is by no means uncommon for the patient to be reduced to a state of profound and even dangerous debility.

Treatment.—Much may be done by proper care to prevent the formation of abscess, especially by removing engorgement of the lacteal ducts, when threatened, by gentle hand friction in the manner already indicated. When the general symptoms, and the local tenderness, indicate that inflammation has commenced, we should at once endeavor to moderate it, in the hope that resolution may occur without the formation of pus. Here general principles must be attended to, especially giving the affected part as much rest as possible. Feverishness may be combated by gentle saline, minute doses of aconite, and large doses of quinine; while pain should be relieved by opiates. The patient should be strictly confined in bed, and the affected breast supported by a suspensory bandage. Warmth and moisture are the best means of relieving the local pain, either in the form of hot fomentations, or of light poultices of linseed-meal or bread and milk, and the breast may be smeared with extract of belladonna rubbed down with glycerin, or the belladonna liniment sprinkled over the surface of the poultices. Generally the pain and irritation produced by putting the child to the breast are so great as to contra-indicate nursing from the affected side altogether, and we must trust to relieving the tension by poultices; suckling being, in the meantime, carried on by the other breast alone. In favorable cases this is quite possible for a time, and it may be that, if the inflammation do not end in suppuration, or if the abscess be small and localized, the affected breast is again able to resume its functions. Often this is not possible, and it may be advisable, in severe cases, to give up nursing altogether.

Pus should be Removed as soon as Possible.—The subsequent management of the case consists in the opening of the abscess as soon as the existence of pus is ascertained, either by fluctuation, or, if the site of the abscess be deep-seated, by the exploring needle. It may be laid down as a principle, that the sooner the pus is evacuated the better, and nothing is to be gained by waiting until it is superficial. On the contrary, such delay only leads to more extensive disorganization of tissue and the further spread of inflammation.

Antiseptic Treatment.—The method of opening the abscess is of primary importance. It has always been customary simply to open the abscess at its most depending part, without using any precaution against the admission of air, and afterwards to treat secondary abscesses in the same way. The results are well known to all practical accoucheurs, and the records of surgery fully show how many weeks or months generally elapse in bad cases before recovery is complete. The antiseptic treatment of mammary abscess, in the way first pointed out by Lister, afford results which are of the most remarkable and satisfactory kind. Instead of being weeks and months in healing, I believe that the practitioner who fairly and minutely carries out Mr. Lister's directions may confidently look for complete closure of the abscess in a few days; and I know nothing, in the whole range of my professional experience, that has given me more satisfaction than the application of this method to abscesses of the breast. The plan I first used is that recommended by Lister in the *Lancet* for 1867, but which is now superseded by his improved methods, which, of course, will be used in preference by all who have made themelves familiar with the details of antiseptic surgery. The former, however, is easily within the reach of every one, and is so simple that no special skill or practice is required in its application; whereas the more perfected antiseptic appli-

ances will probably not be so readily obtained, and are much more difficult to use. I, therefore, insert Mr. Lister's original directions, which he assures me are perfectly aseptic, for the guidance of those who may not be able to obtain the more elaborate dressings: "A solution of one part of crystallized carbolic acid in four parts of boiled linseed oil having been prepared, a piece of rag from four to six inches square is dipped into the oily mixture, and laid upon the skin where the incision is to be made. The lower edge of the rag being then raised, while the upper edge is kept from slipping by an assistant, a common scalpel or bistoury dipped in the oil is plunged into the cavity of the abscess, and an opening about three-quarters of an inch in length is made, and the instant the knife is withdrawn the rag is dropped upon the skin as an antiseptic curtain, beneath which the pus flows out into a vessel placed to receive it. The cavity of the abscess is firmly pressed, so as to force out all existing pus as nearly as may be (the old fear of doing mischief by rough treatment of the pyogenic membrane being quite ill-founded); and if there be much oozing of blood, or if there be considerable thickness of parts between the abscess and the surface, a piece of lint dipped in the antiseptic oil is introduced into the incision to check bleeding and prevent primary adhesion, which is otherwise very apt to occur. The introduction of the lint is effected as rapidly as may be, and under the protection of the antiseptic rag. Thus the evacuation of the original contents is accomplished with perfect security against the introduction of living germs. This, however, would be of no avail unless an antiseptic dressing could be applied that would effectually prevent the decomposition of the stream of pus constantly flowing out beneath it. After numerous disappointments, I have succeeded with the following, which may be relied upon as absolutely trustworthy: About six teaspoonfuls of the above-mentioned solution of carbolic acid in linseed oil are mixed up with common whiting (carbonate of lime) to the consistence of a firm paste,—which is, in fact, glazier's putty with the addition of a little carbolic acid. This is spread upon a piece of common tin-foil about six inches square, so as to form a layer about a quarter of an inch thick. The tin-foil, thus spread with putty, is placed upon the skin, so that the middle of it corresponds to the position of the incision, the antiseptic rag used in opening the abscess being removed the instant before. The tin is then fixed securely by adhesive plaster, the lowest edge being left free for the escape of the discharge into a folded towel placed over it and secured by a bandage. The dressing is changed, as a general rule, once in 24 hours, but if the abscess be a very large one, it is prudent to see the patient 12 hours after it has been opened, when, if the towel should be much stained with discharge the dressing should be changed, to avoid subjecting its antiseptic virtues to too severe a test. But after the first 24 hours a single daily dressing is sufficient. The changing of the dressing must be methodically done as follows: A second similar piece of tin-foil having been spread with the putty, a piece of rag is dipped in the oily solution and placed on the incision the moment the first tin is removed. This guards against the possibility of mischief occurring during the cleansing of the skin with a dry cloth, and pressing out any discharge which may exist in the cavity. If a plug of lint was introduced when the abscess was opened, it is removed under cover of the antiseptic rag, which is taken off at the moment when the new tin is to be applied. The same process is continued daily until the sinus closes."

Treatment of Long-continued Suppuration and Fever.—If the case come under our care when the abscess has been long discharging, or when sinuses have formed, the treatment is directed mainly to procuring a cessation of suppuration and closure of the sinuses. For this purpose, methodical strapping of the breast with adhesive plaster, so as to afford steady support and compress the opposing pyogenic surfaces, will give the best results. It may be necessary to lay open some of the sinuses, or to inject tinct. iodi or other stimulating lotions, so as to moderate the discharge, the subsequent surgical treatment varying according to the requirements of each case. As the drain on the system is great, and the constitutional debility generally pronounced, much attention must be paid to general treatment; and abundance of nourishing food, appropriate stimulants, and such medicines as iron and quinine, will be indicated.

Hand-feeding.—In a considerable number of cases, the inability of the mother to nurse the child, her invincible repugnance to a wet nurse, or inability to bear the expense, renders hand-feeding essential. It is, therefore, of importance that the accoucheur should be thoroughly familiar with the best method of bringing up the child by hand, so as to be able to direct the process in the way that is most likely to be successful.

Causes of Mortality in Hand-fed Children.—Much of the mortality following hand-feeding may be traced to unsuitable food. Among the poorer classes especially there is a prevalent notion that milk alone is insufficient; and hence the almost universal

custom of administering various farinaceous foods, such as corn-flour or arrow-root, even from the earliest period. Many of these consist of starch alone, and are therefore absolutely unsuited for forming the staple of diet, on account of the total absence of nitrogenous elements. Independently of this, it has been shown that the saliva of infants has not the same digestive property on starch that it subsequently acquires, and this affords a further explanation of its so constantly producing intestinal derangement. Reason, as well as experience, abundantly prove that the object to be aimed at in hand-feeding is to imitate as nearly as possible the food which nature supplies for the newborn child, and therefore the obvious course is to use milk from some animal, so treated as to make it resemble human milk as nearly as may be.

Ass's Milk.—Of the various milks used, that of the ass, on the whole, most closely resembles human milk, containing less casein and butter and more saline ingredients. It is not always easy to obtain, and in towns is excessively expensive. Moreover, it does not always agree with the child, being apt to produce diarrhoea. We can, however, be more certain of its being unadulterated, which, in large cities, is in itself no small advantage, and it may be given without the addition of water or sugar.

Goat's milk in this country is still more difficult to obtain, but it often succeeds admirably. In many places the infant sucks the teat directly, and certainly thrives well on the plan.

[We reverse the order in this country, where the ass is seldom seen, and the goat quite common, particularly in the suburbs of our large cities, where its milk is most required. I have seen marvellous results from feeding sick infants with its milk freshly drawn, and diluted with hot water. I do not believe its milk is as suitable as that of the cow, but it has the advantage that it can be obtained freshly drawn in a city, by keeping the animal in the yard or on a vacant lot. The goat should be fed upon grass and other suitable diet, and not permitted to run at large, as it cats with impunity stramonium and other noxious weeds.—Ed.]

Cow's Milk and its Preparation.—In a large majority of cases we have to rely on cow's milk alone. It differs from human milk in containing less water, a larger amount of casein and solid matters, and less sugar. Therefore, before being given, it requires to be diluted and sweetened. A common mistake is over-dilution, and it is far from rare for nurses to administer one-third cow's milk to two-thirds water. The result of this excessive dilution is, that the child becomes pale and puny, and has none of the firm and p'ump appearance of a well-fed infant. The practitioner should, therefore, ascertain that this mistake is not being made; and the necessary dilution will be best obtained by adding to pure fresh cow's milk, one-third hot water, so as to warm the mixture to about 96°, the whole being slightly sweetened with sugar of milk, or ordinary crystallized sugar. After the first two or three months the amount of water may be lessened, and pure milk, warmed and sweetened, given instead.¹ Whenever it is possible, the milk should be obtained from the same cow, and in towns some care is requisite to see that the animal is properly fed and stabled. Of late years it has been customary to obviate the difficulties of obtaining good fresh milk by using some of the tinned milks now so easily to be had. These are already sweetened, and sometimes answer well, if not given in too weak a dilution. One great drawback in bottle-feeding is the tendency of the milk to become acid, and hence to produce diarrhoea. This may be obviated to a great extent by adding a tablespoonful of lime-water to each bottle, instead of an equal quantity of water.

Artificial Human Milk.—An admirable plan of treating cow's milk, so as to reduce it to almost absolute chemical identity with human milk has been devised by Professor Frankland, to whom I am indebted for permission to insert the receipt. I have followed this method in many cases, and find it far superior to the usual one, as it produces an exact and uniform compound. With a little practice nurses can employ it with no more trouble than the ordinary mixing of cow's milk with water and sugar. The following extracts from Dr. Frankland's work² will explain the principles on which the preparation of the artificial human milk is founded: "The rearing of infants who cannot be supplied with their natural food is notoriously difficult and uncertain, owing chiefly to the great difference in the chemical composition of human milk and cow's milk. The latter is much richer in casein and poorer in milk-sugar than the former,

[I have been obliged with quite young infants, in some instances, to change from Alderney to common cow's milk, as the larger proportion of butter in the former makes it too unlike that of the woman to agree with the child. It is well to recommend the milk of one cow, but many who claim to bring it fill the little can out of the big one on their round in the city. A very young cow and an old one are not suitable. In country practice, the selected cow system is often quite effective.—Ed.]

² Frankland's Experimental Researches in Chemistry, p. 843.

whilst asses' milk, which is sometimes used for feeding infants, is too poor in casein and butter, although the proportion of sugar is nearly the same as in human milk. The relations of the three kinds of milk to each other are clearly seen from the following analytical numbers, which express the percentage amounts of the different constituents:

	Woman.	Ass.	Cow.
Casein	2.7	1.7	4.2
Butter	3.5	1.3	3.8
Milk-sugar	5.0	4.5	3.8
Salts2	.5	.7

These numbers show that by the removal of one-third of the casein from cow's milk and the addition of about one-third more milk-sugar a liquid is obtained which closely approaches human milk in composition, the percentage amounts of the four chief constituents being as follows:

Casein	2.8
Butter	3.8
Milk-sugar	5.0
Salts7

The following is the mode of preparing the milk: Allow one-third of a pint of new milk to stand for about twelve hours, remove the cream and add to it two-thirds of a pint of new milk, as fresh from the cow as possible. Into the one-third of a pint of blue milk left after the abstraction of the cream, put a piece of rennet about one inch square. Set the vessel in warm water until the milk is fully curdled, an operation requiring from five to fifteen minutes, according to the activity of the rennet, which should be removed as soon as the curdling commences, and put into an egg-cup for use on subsequent occasions, as it may be employed daily for a month or two. Break up the curd repeatedly, and carefully separate the whole of the whey, which should then be rapidly heated to boiling in a small tin pan placed over a spirit or gas lamp. During the heating a further quantity of casein, technically called 'fleetings,' separates, and must be removed by straining through muslin. Now dissolve 110 grains of powdered sugar of milk in the hot whey, and mix it with the two-thirds of a pint of new milk to which the cream from the other third of a pint was added as already described. The artificial milk should be used within twelve hours of its preparation, and it is almost needless to add that all the vessels employed in its manufacture and administration should be kept scrupulously clean."

Method of Hand-feeding.—Much of the success of bottle-feeding must depend on minute care and scrupulous cleanliness, points which cannot be too strongly insisted on. Particular attention should be paid to preparing the food fresh for every meal, and to keeping the feeding-bottle and tubes constantly in water when not in use, so that minute particles of milk may not remain about them and become sour. A neglect of this is one of the most fertile sources of the thrush from which bottle-fed infants often suffer. The particular form of bottle used is not of much consequence. Those now commonly employed, with a long India-rubber tube attached, are preferable to the older forms of flat bottle, as they necessitate strong suction on the part of the infant, thus forcing it to swallow the food more slowly. Care must be taken to give the meals at stated periods, as in breast-feeding, and these should be at first about two hours apart, the intervals being gradually extended. The nurse should be strictly cautioned against the common practice of placing the bottle beside the infant in its cradle, and allowing it to suck to repletion, a practice which leads to over-distension of the stomach, and consequent dyspepsia. The child should be raised in the arms at the proper time, have its food administered, and then be replaced in the cradle to sleep. In the first few weeks of bottle-feeding constipation is very common, and may be effectually remedied by placing as much phosphate of soda as will lie on a threepenny piece in the bottle, two or three times in the twenty-four hours.

Other kinds of Food.—If this system succeed, no other food should be given until the child is six or seven months old, and then some of the various infant's food may be cautiously commenced. Of these there are an immense number in common use; some of which are good articles of diet, others are unfitted for infants. In selecting them we have to see that they contain the essential elements of nutrition in proper combination. All those, therefore, that are purely starchy in character, such as arrow-root, corn-flour, and the like, should be avoided; while those that contain nitrogenous as well as starch elements, may be safely given. Of the latter the entire wheat flour, which

contains the husks ground down with the wheat, generally answers admirably; and of the same character are rusks, tops and bottoms, Nestle's or Liebig's infant's food, and many others. If the child be pale and flabby, some more purely animal food may often be given twice a day, and great benefit may be derived from a single meal of beef, chicken, or veal tea, with a little bread crumb in it, especially after the sixth or seventh month. Milk, however, should still form the main-article of diet, and should continue to do so for many months.

Management when Milk disagrees.—If the child be pale, flabby, and do not gain flesh, more especially if diarrhœa or other intestinal disturbance be present, we may be certain that hand-feeding is not answering satisfactorily, and that some change is required. If the child be not too old, and will still take the breast, that is certainly the best remedy, but if that be not possible, it is necessary to alter the diet. When milk disagrees, cream, in the proportion of one table-spoonful to three of water, sometimes answers as well. Occasionally also Liebig's infant's food, when carefully prepared, renders good service. Too often, however, when once diarrhœa or other intestinal disturbance has set in, all our efforts may prove unavailing, and the health, if not the life, of the infant, becomes seriously imperilled. It is not, however, within the scope of this work to treat of the disorders of infants at the breast, the proper consideration of which requires a large amount of space, and I, therefore, refrain from making any further remarks on the subject.

[As a general rule, children in this country are better kept exclusively on a milk diet for at least ten months, especially if it is in the summer season. The best addition then, is exciccated wheat flour prepared by the process of Hards, and known as Hards's farinaceous food, prepared wheat, imperial granum, etc. Ohio groats made of the oat kernel, and prepared barley flour, are sometimes useful where the habit of the child is constipated.—Ed.]

CHAPTER III.

PUERPERAL ECLAMPSIA.

By the term *puerperal eclampsia* is meant a peculiar kind of epileptiform convulsions, which may occur in the latter months of pregnancy, or during, or after parturition, and it constitutes one of the most formidable diseases with which the obstetrician has to cope. The attack is often so sudden and unexpected, so terrible in its nature, and attended with such serious danger both to the mother and child, that the disease has attracted much attention.

Its Doubtful Etiology.—The researches of Lever, Braun, Frerichs, and many other writers who have shown the frequent association of eclampsia with albuminuria, have, of late years, been supposed to clear up to a great extent the etiology of the disease, and to prove its dependence on the retention of urinary elements in the blood. While the urinary origin of eclampsia has been pretty generally accepted, more recent observations have tended to throw doubt on its essential dependence on this cause; so that it can hardly be said that we are yet in a position to explain its true pathology with certainty. These points will require separate discussion, but it is first necessary to describe the character and history of the attack.

Considerable confusion exists in the description of puerperal convulsions from the confounding of several essentially distinct diseases under the same name. Thus, in most obstetric works, it has been customary to describe three distinct classes of convulsion; the *epileptic*, the *hysterical*, and the *apoplectic*. The two latter, however, come under a totally different category. A pregnant woman may suffer from hysterical paroxysms, or she may be attacked with apoplexy, accompanied with coma, and followed by paralysis. But these conditions in the pregnant or parturient woman are identical with the same diseases in the non-pregnant, and are in no way special in their nature. True eclampsia, however, is different in its clinical history from epilepsy; although the paroxysms, while they last, are essentially the same as those of an ordinary epileptic fit.

Premontory Symptoms.—An attack of eclampsia seldom occurs without having been preceded by certain more or less well-marked precursory symptoms. It is true that in

a considerable number of cases these are so slight as not to attract attention, and suspicion is not aroused until the patient is seized with convulsions. Still, subsequent investigations will very generally show that some symptoms did exist, which, if observed and properly interpreted, might have put the practitioner on his guard, and possibly enable him to ward off the attack. Hence a knowledge of them is of real practical value. The most common are associated with the cerebrum, such as severe headache, which is the one most generally observed, and is sometimes limited to one side of the head. Transient attacks of dizziness, spots before the eyes, loss of sight, or impairment of the intellectual faculties, are also not uncommon. These signs in a pregnant woman are of the gravest import, and should at once call for investigation into the nature of the case. Less marked indications sometimes exist in the form of irritability, slight headache, or stupor, and a general feeling of indisposition. Another important premonitory sign is œdema of the subcutaneous cellular tissue, especially of the face or upper extremities, which should at once lead to an examination of the urine.

Symptoms of the Attack.—Whether such indications have preceded an attack or not, as soon as the convulsion comes on there can no longer be any doubt as to the nature of the case. The attack is generally sudden in its onset, and in its character is precisely that of a severe epileptic fit, or of the convulsions in children. Close observation shows that there is at first a short period of tonic spasm, affecting the entire muscular system. This is almost immediately succeeded by violent clonic contractions, generally commencing in the muscles of the face, which twitch violently; the expression is horribly altered; the globes of the eyes are turned up under the eyelids, so as to leave only the white sclerotics visible, and the angles of the mouth are retracted and fixed in a convulsive grin. The tongue is at the same time protruded forcibly, and, if care be not taken, is apt to be lacerated by the violent grinding of the teeth. The face, at first pale, soon becomes livid and cyanosed, while the veins of the neck are distended, and the carotids beat vigorously. Frothy saliva collects about the mouth, and the whole appearance is so changed as to render the patient quite unrecognizable. The convulsive movements soon attack the muscles of the body. The hands and arms, at first rigidly fixed, with the thumbs clinched into the palms, begin to jerk, and the whole muscular system is thrown into rapidly-recurring convulsive spasms. It is evident that the involuntary muscles are implicated in the convulsive action, as well as the voluntary. This is shown by a temporary arrest of respiration at the commencement of the attack, followed by irregular and hurried respiratory movements, producing a peculiar hissing sound. The occasional involuntary expulsion of urine and feces indicates the same fact. During the attack the patient is absolutely unconscious, sensibility is totally suspended, and she has afterwards no recollection of what has taken place. Fortunately the convulsion is not of long duration, and, at the outside, does not last more than three or four minutes, generally not so long. In most cases, after an interval, there is a recurrence of the convulsion, characterized by the same phenomena, and the paroxysms are repeated with more or less force and frequency according to the severity of the attack. Sometimes several hours may elapse before a second convulsion comes on; at others the attacks may recur very often, with only a few minutes between them. In the slighter forms of eclampsia there may not be more than 2 or 3 paroxysms in all; in the more serious as many as 50 or 60 have been recorded.

Condition between the Attacks.—After the first attack the patient generally soon recovers her consciousness, being somewhat dazed and somnolent, with no clear perception of what has occurred. If the paroxysms be frequently repeated, more or less profound coma continues in the intervals between them, which, no doubt, depends upon intense cerebral congestion, resulting from the interference with the circulation in the great veins of the neck, produced by spasmodic contraction of the muscles. The coma is rarely complete, the patient showing signs of sensibility when irritated, and groaning during the uterine contractions. In the worst class of cases, the torpor may become intense and continuous, and in this state the patient may die. When the convulsions have entirely stopped, and the patient has completely regained her consciousness, and is apparently convalescent, recollection of what has taken place during, and sometime before, the attack, may be entirely lost, and this condition may last for a considerable time. A curious instance of this once came under my notice in a lady who had lost a brother to whom she was greatly attached, in the week immediately preceding her confinement, and in whom the mental distress seemed to have had a good deal to do in determining the attack. It was many weeks before she recovered her memory, and during that time she recollected nothing about the circumstances connected with her brother's death, the whole of that week being, as it were, blotted out of her recollection.

Relation of the Attacks to Labor.—If the convulsions come on during pregnancy, we may look upon the advent of labor as almost a certainty; and if we consider the severe nervous shock and general disturbance, this is the result we might reasonably anticipate. If they occur, as is not uncommon, for the first time during labor, the pains generally continue with increased force and frequency, since the uterus partakes of the convulsive action. It has not rarely happened that the pains have gone on with such intensity that the child has been born quite unexpectedly, the attention of the practitioner being taken up with the patient. In many cases the advent of fresh paroxysms is associated with the commencement of a pain, the irritation of which seems sufficient to bring on the convulsion.

Results to the Mother and Child.—The results of eclampsia vary according to the severity of the paroxysms. It is generally said that about 1 in 3 or 4 cases dies. The mortality has certainly lessened of late years, probably in consequence of improved knowledge of the nature of the disease, and more rational modes of treatment. This is well shown by Barker,¹ who found in 1855 a mortality of 32 per cent. in cases occurring before and during labor, and 22 per cent. in those after labor; while since that date the mortality has fallen to 14 per cent. The same conclusion is arrived at by Dr. Phillips,² who has shown that the mortality has greatly lessened since the practice of repeated and indiscriminate bleeding, long considered the sheet anchor in the disease, has been discontinued, and the administration of chloroform substituted.

Cause of Death.—Death may occur during the paroxysm, and then it may be due to the long continuance of the tonic spasm producing asphyxia. It is certain that, as long as the tonic spasm lasts, the respiration is suspended, just as in the convulsive disease of children known as laryngismus stridulus; and it is possible also that the heart may share in the convulsive contraction which is known to affect other involuntary muscles. More frequently, death happens at a later period, from the combined effects of exhaustion and asphyxia. The records of post-mortem examinations are not numerous; in those we possess the principal changes have been an anæmic condition of the brain, with some œdematous infiltration. In a few rare cases the convulsions have resulted in effusion of blood into the ventricles, or at the base of the brain. The prognosis as regards the child is also serious. Out of 36 children, Hall Davis found 26 born alive, 10 being still-born. There is good reason to believe that the convulsion may attack the child *in utero*; of this several examples are mentioned by Cazeaux; or it may be subsequently attacked with convulsions, even when apparently healthy at birth.

Pathology of the Disease.—The precise pathology of eclampsia cannot be considered by any means satisfactorily settled. When, in the year 1843, Lever first showed that the urine in patients suffering from puerperal convulsions was generally highly charged with albumen—a fact which subsequent experience has amply confirmed—it was thought that a key to the etiology of the disease had been found. It was known that chronic forms of Bright's disease were frequently associated with retention of urinary elements in the blood, and not rarely accompanied by convulsions. The natural inference was drawn, that the convulsions of eclampsia were also due to toxæmia resulting from the retention of urea in the blood, just as in the uræmia of chronic Bright's disease; and this view was adopted and supported by the authority of Braun, Ferriehs, and many other writers of eminence, and was pretty generally received as a satisfactory explanation of the facts. Ferriehs modified it so far, that he held that the true toxic element was not urea as such, but carbonate of ammonia, resulting from its decomposition; and experiments were made to prove that the injection of this substance into the veins of the lower animals produced convulsions of precisely the same character as eclampsia. Dr. Hammond,³ of Maryland, subsequently made a series of counter experiments, which were held as proving that there was no reason to believe that urea ever did become decomposed in the blood in the way that Ferriehs supposed, or that the symptoms of uræmia were ever produced in this way. Spiegelberg⁴ has, more recently, again examined the question both clinically, in a patient suffering from convulsions, in whose blood an excess of ammonia and urea was found, and by experiments on dogs, and maintains the accuracy of Ferriehs's views. Others have believed that the poisonous elements retained in the blood are not urea or the products of its decomposition, but other extractive matters which have escaped detection. As time elapsed, evidence accumulated to show that the relation between albuminuria and eclampsia was not so universal as was supposed, or at least that some other factors were necessary to explain many of the cases. Numerous cases were observed in which albumen was detected in large quantities, without any convulsion following, and that, not only in women who

¹ The Puerperal Disease, p. 125.

³ Amer. Journ., 1861.

² Guy's Hosp. Reps., 1870.

⁴ Arch. f. Gyn., 1870.

had been the subject of Bright's disease before conception, but also when the albuminuria was known to have developed during pregnancy. Thus Imbert Goubeyre found that out of 164 cases of the latter kind, 95 had no eclampsia; and Blot, out of 41 cases, found that 34 were delivered without untoward symptoms. It may be taken as proved, therefore, that albuminuria is by no means necessarily accompanied by eclampsia. Cases were also observed in which the albumen only appeared after the convulsion; and in these it was evident that the retention of urinary elements could not have been the cause of the attack; and it is highly probable that in them the albuminuria was produced by the same cause which induced the convulsion. Special attention has been called to this class of cases by Braxton Hicks,¹ who has recorded a considerable number of them. He says that the nearly simultaneous appearance of albuminuria and convulsion—and it is admitted that the two are almost invariably combined—must then be explained in one of three ways.

1. That the convulsions are the cause of the nephritis.

2. That the convulsions and the nephritis are produced by the same cause, *e. g.*, some detrimental ingredient circulating in the blood, irritating both the cerebro-spinal system and other organs at the same time.

3. That the highly congested state of the venous system, induced by the spasm of the glottis in eclampsia, is able to produce the kidney complication.

Theory of Traube and Rosenstein.—More recently Traube and Rosenstein have advanced a theory of eclampsia, purporting to explain these anomalies. They refer the occurrence of eclampsia to acute cerebral anæmia, resulting from changes in the blood incident to pregnancy. The primary factor is the hydræmic condition of the blood, which is an ordinary concomitant of the pregnant state, and, of course, when there is also albuminuria, the watery condition of the blood is greatly intensified; hence the frequent association of the two states. Accompanying this condition of the blood, there is increased tension of the arterial system, which is favored by the hypertrophy of the heart, which is known to be a normal occurrence in pregnancy. The result of these combined states is a temporary hyperæmia of the brain, which is rapidly succeeded by serous effusion into the cerebral tissues, resulting in pressure on its minute vessels, and consequent anæmia. There is much in this theory that accords with the most recent views as to the etiology of convulsive disease; as, for example, the researches of Kussinaul and Tenner, who had experimentally proved the dependence of convulsion on cerebral anæmia, and of Brown-Séguard, who showed that an anæmic condition of the nerve-centres preceded an epileptic attack. It explains also very satisfactorily how the occurrence of labor should intensify the convulsions, since, during the acme of the pains, the tension of the cerebral arterial system is necessarily greatly increased. There are, however, obvious difficulties against its general acceptance. For example, it does not satisfactorily account for those cases which are preceded by well-marked precursory symptoms, and in which an abundance of albumen is present in the urine. Here the premonitory signs are precisely those which precede the development of uræmia in chronic Bright's disease, the dependence of which on the retention in the blood of urinary elements can hardly be doubted.

Views of MacDonal.—MacDonal² has published an interesting paper on this subject, in which he describes two very careful post-mortem examinations. In these he found extreme anæmia of the cerebro-spinal centres, with congestion of the meninges, but no evidence of œdema. He inclines to the belief that eclampsia is caused by irritation of the vaso-motor centre in consequence of an anæmic condition of the blood, produced by the retention in it of excrementitious matters which the kidneys ought to have removed, this over-stimulation resulting in anæmia of the deeper seated nerve-centres and consequent convulsion.

Excitability of Nervous System.—The key to the liability of the puerperal woman to convulsive attacks is, no doubt, to be found in the peculiar excitable condition of the nervous system in pregnancy—a fact which was clearly pointed out by the late Dr. Tyler Smith, and by many other writers. Her nervous system is, in this respect, not unlike that of children, in whom the predominant influence and great excitability of the nervous system are well-established facts, and in whom precisely similar convulsive seizures are of common occurrence on the application of a sufficiently exciting cause.

Exciting Causes.—Admitting this, we require some cause to set the predisposed nervous system into morbid action: and this we may have either in a toxæmic, or in an extremely watery, condition of the blood, associated with albuminuria; or along with these, or sometimes independently of them, in some excitement, such as strong emo-

¹ Obstet. Trans., vol. viii.

² See his vol. of Collected Essays, entitled Heart Disease During Pregnancy, London, 1878.

tional disturbance. It is highly probable, however, that extreme anæmia is one of the actual conditions of the nerve-centres—a fact of much practical importance in reference to treatment.

Treatment.—The management of cases in which the occurrence of suspicious symptoms has led to the detection of albuminuria, has already been fully discussed. We shall, therefore, here only consider the treatment of cases in which convulsions have actually occurred.

Venesection.—Until quite recently venesection was regarded as the sheet anchor in the treatment, and blood was always removed copiously, and, there is sufficient reason to believe, with occasional remarkable benefit. Many cases are recorded in which a patient, in apparently profound coma, rapidly regained her consciousness when blood was extracted in sufficient quantity. The improvement, however, was often transient, the convulsions subsequently recurring with increased vigor. There are good theoretical grounds for believing that blood-letting can only be of merely temporary use, and may even increase the tendency to convulsion. These are so well put by Schroeder, that I cannot do better than quote his observations on this point. "If," he says, "the theory of Traube and Rosenstein be correct, a sudden depletion of the vascular system, by which the pressure is diminished, must stop the attacks. From experience it is known that after venesection the quantity of blood soon becomes the same through the serum taken from all the tissues, while the quality is greatly deteriorated by the abstraction of blood. A short time after venesection we shall expect to find the former blood-pressure in the arterial system, but the blood far more watery than previously. From this theoretical consideration, it follows that abstraction of blood, if the above-mentioned conditions really cause convulsions, must be attended by an immediate favorable result, and, under certain circumstances, the whole disease may surely be cut short by it. But, if all other conditions remain the same, the blood-pressure will, after some time, again reach its former height. The quantity of blood has, in the meantime, been greatly deteriorated, and consequently the danger of the disease will be increased."

In Properly-selected Cases Venesection is a Valuable Remedy.—These views sufficiently well explain the varying opinions held with regard to this remedy, and enable us to understand why, while the effects of venesection have been so lauded by certain authors, the mortality has admittedly been much lessened since its indiscriminate use has been abandoned. It does not follow because a remedy, when carried to excess, is apt to be hurtful, that it should be discarded altogether; and I have no doubt that, in properly-selected cases, and judiciously employed, venesection is a valuable aid in the treatment of eclampsia, and that it is specially likely to be useful in mitigating the first violence of the attack, and in giving time for other remedies to come into action. Care should, however, be taken to select the cases properly, and it will be specially indicated when there is marked evidence of great cerebral congestion and vascular tension, such as a livid face, a full bounding pulse, and strong pulsation in the carotids. The general constitution of the patient may also serve as a guide in determining its use, and we shall be the more disposed to resort to it if the patient be a strong and healthy woman; while, on the other hand, if she be feeble and weak, we may wisely discard it, and trust entirely to other means. In any case, it must be looked upon as a temporary expedient only; useful in warding off immediate danger to the cerebral tissues, but never as the main agent in treatment. Nor can it be permissible to bleed in the heroic manner frequently recommended. A single bleeding, the amount regulated by the effect produced, is all that is ever likely to be of service.

[After the discovery of the uræmic origin of eclampsia in pregnant women, the treatment by bleeding was very generally abandoned in the United States; but the more recent investigations of the causes of death have produced a reconsideration of this plan of treatment, and the tendency of the profession during the last ten years has been towards venesection, as a preventive of cerebral complications. In primiparæ with a full pulse and flushed face, the rule with many of our obstetrical practitioners is to bleed the patient as early as practicable, and do this at least once effectually, so as to produce, if possible, a noticeable impression. Where there are positive evidences of the existence of Bright's disease, of course this is inadmissible.—ED.]

Compression of the Carotids.—As a temporary expedient, having the same object in view, compression of the carotids during the paroxysms is worthy of trial. This was proposed by Trousseau in the eclampsia of infants, and in the single case of eclampsia in which I have tried it, it seemed to be decidedly beneficial. It is a simple measure, and it offers the advantage of not leading to any permanent deterioration of the blood, as in venesection.

Administration of Purgatives.—As a subsidiary means of diminishing vascular tension, the administration of a strong purgative is desirable, and has the further effect of

removing any irritant matter that may be lodged in the intestinal tract. If the patient be conscious, a full dose of the compound jalap powder may be given, or a few grains of calomel combined with jalap; and if she be comatose, and unable to swallow, a drop of croton oil, or a quarter of a grain of elaterium, may be placed on the back of the tongue.

Administration of Sedatives and Narcotics.—The great indication in the management of eclampsia is the controlling of convulsive action by means of sedatives. Foremost amongst them must be placed the inhalation of chloroform, a remedy which is frequently remarkably useful, and which has the advantage of being applicable at all stages of the disease, and whether the patient be comatose or not. Theoretical objections have been raised against its employment, as being likely to increase cerebral congestion; of this there is no satisfactory proof; on the contrary, there is reason to think that chloroform inhalation has rather the effect of lessening arterial tension, while it certainly controls the violent muscular action by which the hyperemia is so much increased. Practically no one who has used it can doubt its great value in diminishing the force and frequency of the convulsive paroxysms. Statistically its usefulness is shown by Charpentier, in his thesis on the effects of various methods of treatment in eclampsia, since out of 63 cases in which it was used, in 48 it had the effect of diminishing or arresting the attacks, 1 only proving fatal. The mode of administration has varied. Some have given it almost continuously, keeping the patient in a more or less profound state of anesthesia. Others have contented themselves with carefully watching the patient, and exhibiting the chloroform as soon as there were any indications of a recurring paroxysm, with the view of controlling its intensity. The latter is the plan I have myself adopted, and of the value of which, in most cases, I have no doubt. Every now and again, cases will occur in which chloroform inhalation is sufficient to control the paroxysm, or in which, from the very cyanosed state of the patient, its administration seems contra-indicated. Moreover, it is advisable to have, if possible, some remedy more continuous in its action, and requiring less constant personal supervision. Lately the internal administration of chloral has been recommended for this purpose. My own experience is decidedly in its favor, and I have used, as I believe, with marked advantage a combination of chloral with bromide of potassium, in the proportion of twenty grains of the former to half a drachm of the latter, repeated at intervals of from four to six hours. If the patient be unable to swallow, the chloral may be given in an enema, or hypodermically, six grains being diluted in ʒj of water, and injected under the skin. The remarkable influence of bromide of potassium in controlling the eclampsia of infants would seem to be an indication for its use in puerperal cases. Fordyce Barker is opposed to the use of chloral, which he thinks excites instead of lessening reflex irritability.¹ Another remedy, not entirely free from theoretical objections, but strongly recommended, is the subcutaneous injection of morphia, which has the advantage of being applicable when the patient is quite unable to swallow. It may be given in doses of one-third of a grain, repeated in a few hours, so as to keep the patient well under its influence. It is to be remembered that the object is to control muscular action, so as to prevent, as much as possible, the violent convulsive paroxysm, and, therefore, it is necessary that the narcosis, however produced, should be continuous. It is rational, therefore, to combine the intermittent action of chloroform with the more continuous action of other remedies, so that the former should supplement the latter when insufficient. Pilocarpin has recently been tried in the hope that the diaphoresis and salivation it produces might diminish arterial tension and free the blood of toxic matters. Braun² administered three centigrammes of the muriate of pilocarpin hypodermically, and reports favorably of the result; Fordyce Barker,³ however, is of opinion that it produces so much depression as to be dangerous.

Other remedies. supposed to act in the way of antidotes to uræmic poisoning, have been advised, such as acetic or benzoic acid, but they are far too uncertain to have any reliance placed on them, and they distract attention from more useful measures.

Precautions during the Paroxysm.—Precautions are necessary during the fits to prevent the patient injuring herself, especially to obviate laceration of the tongue; the latter can be best done by placing something between the teeth as the paroxysm comes on, such as the handle of a teaspoon enveloped in several folds of flannel.

Obstetric Management.—The obstetric management of eclampsia will naturally give rise to much anxiety, and on this point there has been considerable difference of opinion. On the one hand, we have practitioners who advise the immediate emptying of the uterus, even when labor has commenced; on the other, those who would leave the

¹ The Puerperal Diseases, p. 120.

² Berlin Klin. Woch., June 16, 1879.

³ New York Med. Rec., March 1, 1879.

labor entirely alone. Thus Gooch said, "attend to the convulsions, and leave the labor to take care of itself;" and Schroeder says, "especially no kind of obstetric manipulation is required for the safety of the mother," but he admits, however, that it is sometimes advisable to hasten the labor to insure the safety of the child.

In cases in which the convulsions come on during labor, the pains are often strong and regular, the labor progresses satisfactorily, and no interference is needful. In others we cannot but feel that emptying the uterus would be decidedly beneficial. We have to reflect, however, that any active interference might, of itself, prove very irritating, and excite fresh attacks. The influence of uterine irritation is apparent, by the frequency with which the paroxysms recur with the pains. If, therefore, the os be undilated, and labor have not begun, no active means to induce it should be adopted, although the membranes may be ruptured with advantage, since that procedure tends to no irritation. Forceful dilatation of the os, and especially turning, are strongly contra-indicated.

The rule laid down by Tyler Smith seems that which is most advisable to follow—that we should adopt the course which seems least likely to prove a source of irritation to the mother. Thus if the fits seem evidently induced and kept up by the pressure of the fœtus, and the head be within reach, the forceps or even craniotomy may be resorted to. But if, on the other hand, there be reason to think that the operation necessary to complete delivery is likely *per se* to prove a greater source of irritation than leaving the case to nature then we should not interfere.

CHAPTER IV.

PUERPERAL INSANITY.

Classification.—Under the head of "*Puerperal Mania*" writers on obstetrics have indiscriminately classed all cases of mental disease connected with pregnancy and parturition. The result has been unfortunate, for the distinction between the various types of mental disorder has, in consequence, been very generally lost sight of. But little study of the subject suffices to show that the term *Puerperal Mania* is wrong in more ways than one, for we find that a large number of cases are not cases of "mania" at all, but of melancholia; while a considerable number are not, strictly speaking, "puerperal," as they either come on during pregnancy, or long after the immediate risks of the puerperal period are over, being in the latter case associated with anæmia produced by over-lactation. For the sake of brevity, the generic term "*Puerperal Insanity*" may be employed to cover all cases of mental disorders connected with gestation, which may be further conveniently subdivided into three classes, each having its special characteristics, viz.:

I. *The Insanity of Pregnancy.*

II. *Puerperal Insanity*, properly so called, that is, insanity coming on within a limited period after delivery.

III. *The Insanity of Lactation.*

This division is a strictly natural one, and includes all the cases likely to come under observation. The relative proportion these classes bear to each other can only be determined by accurate statistical observations on a large scale, but these materials we do not possess. The returns from large asylums are obviously open to objection, for only the worst and most confirmed cases find their way into these institutions, while by far the greater proportion, both before and after labor, are treated in their own homes.

Taking such returns as only approximate, we find from Dr. Batty Tuke¹ that in the Edinburgh Asylum out of 105 cases of puerperal insanity, 28 occurred before delivery, 13 during the puerperal period, and 54 during lactation. The relative proportions of each per hundred are as follows:

Insanity of Pregnancy,	18.06 per cent.
Puerperal Insanity,	47.09 "
Insanity of Lactation,	34.08 "

Marce² collects together several series of cases from various authorities, amounting to

¹ Edin. Med. Journ., vol. x.

² *Traité de la Folie des Femmes enceintes.*

310 in all, and the results are not very different from those of the Edinburgh Asylum, except in the relatively smaller number of cases occurring before delivery. The percentage is calculated from his figures:

Insanity of Pregnancy,	8.06 per cent.
Puerperal Insanity,	58.06 “
Insanity of Lactation,	30.30 “

As each of these classes differs in various important respects from the others, it will be better to consider each separately.

Insanity of Pregnancy.—The insanity of pregnancy is, without doubt, the least common of the three forms. The intense mental depression which in many women accompanies pregnancy, and causes the patient to take a desponding view of her condition, and to look forward to the result of her labor with the most gloomy apprehension, seems to be often only a lesser degree of the actual mental derangement which is occasionally met with. The relation between the two states is further borne out by the fact that a large majority of cases of insanity during pregnancy are well-marked types of melancholia; out of 28 cases reported by Tuke, 15 were examples of pure melancholia, 5 of dementia with melancholia. In many of these the attack could be traced as developing itself out of the ordinary hypochondriasis of pregnancy. In others the symptoms came on at a later period of pregnancy, the earlier months of which had not been marked by any unusual lowness of spirits. The age of the patient seems to have some influence, the proportion of cases between 30 and 40 years of age being much larger than in younger women. A large proportion of cases occur in primiparæ than in multiparæ, a fact that no doubt, depends on the greater dread and apprehension experienced by women who are pregnant for the first time, especially if not very young. Hereditary indisposition plays an important part, as in all forms of puerperal insanity. It is not always easy to ascertain the fact of an hereditary taint, since it is often studiously concealed by the friends. Tuke, however, found distinct evidence of it in no less than 12 out of 28 cases. Fürstner¹ believes that other neuroses have an important influence in the causation of the disease. Out of 32 cases he found direct hereditary taint in 9, but in 11 more there was a family history of epilepsy, drunkenness, or hysteria.

Period of Pregnancy at which it Occurs.—The period of pregnancy at which mental derangement most commonly shows itself, varies. Most generally, perhaps, it is at the end of the third, or the beginning of the fourth month. It may, however, begin with conception, and even return with every impregnation. Montgomery relates an instance in which it recurred in three successive pregnancies. Marcé distinguishes between true insanity coming on during pregnancy and aggravated hypochondriasis, by the fact that the latter usually lessens after the third month, while the former most commonly only begins after that date. It is unquestionable that in many cases no such distinction can be made, and that the two are often very intimately associated.

Form of Insanity.—The form of insanity does not differ from ordinary melancholia. The suicidal tendency is generally very strongly developed. Should the mental disorder continue after delivery, the patient may very probably experience a strong impulse to kill her child. Moral perversions have been not uncommonly observed. Tuke especially mentions a tendency to dipsomania in the early months, even in women who have not shown any disposition to excess at other times. He suggests that this may be an exaggeration of the depraved appetite, or morbid craving, so commonly observed in pregnant women, just as melancholia may be a further development of lowness of spirits. Laycock mentions a disposition to “kleptomania” as very characteristic of the disease. Casper² relates a curious case where this occurred in a pregnant lady of rank, and the influence of pregnancy, in developing an irresistible tendency, was pleaded in a criminal trial in which one of her petty thefts had involved her.

Prognosis.—The prognosis may be said to be, on the whole, favorable. Out of Dr. Tuke's 28 cases, 19 recovered within six months. There is little hope of a cure until after the termination of the pregnancy, as out of 19 cases recorded by Marcé only in 2 did the insanity disappear before delivery.

Transient Mania during Delivery.—There is a peculiar form of mental derangement sometimes observed during labor, which is by some talked of as a temporary insanity. It may, perhaps, be more accurately described as a kind of acute delirium, produced, in the latter stage of labor, by the intensity of the suffering caused by the pains.

¹ Archiv. für Psychiatrie, Band v. Heft 2.

² Casper's Forensic Medicine, vol. iv.

According to Montgomery, it is most apt to occur as the head is passing through the os uteri, or, at a later period, during the expulsion of the child. It may consist of merely a loss of control over the mind, during which the patient, unless carefully watched, might, in her agony, seriously injure herself or her child. Sometimes it produces actual hallucination, as in the case described by Tarnier, in which the patient fancied she saw a spectre standing at the foot of her bed, which she made violent efforts to drive away. This kind of mania, if it may be so called, is merely transitory in its character, and disappears as soon as the labor is over. From a medico-legal point of view it may be of importance, as it has been held by some that in certain cases of infanticide the mother has destroyed the child when in this state of transient frenzy, and when she was irresponsible for her acts. In the treatment of this variety of delirium we must, of course, try to lessen the intensity of the suffering, and it is in such cases that chloroform will find one of its most valuable applications.

Puerperal Insanity (proper).—True puerperal insanity has always attracted much attention from obstetricians, often to the exclusion of other forms of mental disturbance connected with the puerperal state. We may define it to be, that form of insanity which comes on within a limited period after delivery, and which is probably intimately connected with that process. Out of 73 examples of the disease tabulated by Dr. Tuke, only 2 came on later than a month after delivery, and in these there were other causes present, which might possibly remove them from this class.

Although a large number of these cases assume the character of acute mania, that is by no means the only kind of insanity which is observed, a not inconsiderable number being well-marked examples of melancholia. The distinction between them was long ago pointed out by Gooch, whose admirable monograph on the disease contains one of the most graphic and accurate accounts of puerperal insanity that has yet been written.

There are also some peculiarities as to the period at which these varieties of insanity show themselves, which taken in connection with certain facts in their etiology, may eventually justify us in drawing a stronger line of demarcation between them than has been usual. It appears that cases of acute mania are apt to come on at a period much nearer delivery than melancholia. Thus Tuke found that all the cases of mania came on within sixteen days after delivery, and that all cases of melancholia developed themselves after that period. We shall presently see that one of the most recent theories as to the causation of the disease attributes it to some morbid condition of the blood. Should further investigation confirm this supposition, inasmuch as septic conditions of the blood are most likely to occur a short time after labor, it would not be an improbable hypothesis that cases of acute mania, occurring within a short time after labor, may depend on such septic causes, while melancholia is more likely to arise from general conditions favoring the development of mental disease. This must, however, be regarded as a mere speculation requiring further investigation.

Causes.—Hereditary predisposition is very frequently met with, and a careful inquiry into the patient's history will generally show that other members of the family have suffered from mental derangement. Reid found that out of 111 cases in Bethlehem Hospital there was clear evidence of hereditary taint in 45. Tuke made the same observation in 22 out of his 73 cases; and, indeed, it is pretty generally admitted by all alienist physicians that hereditary tendencies form one of the strongest predisposing causes of mental disturbance in the puerperal state. In a large proportion of cases circumstances producing debility and exhaustion, or mental depression, have preceded the attack. Thus it is often found that patients attacked with it have had post-partum hæmorrhage, or have suffered from some other conditions producing exhaustion, such as severe and complicated labor; or they may have been weakened by over-frequent pregnancies, or by lactation during the early months of pregnancy. Indeed, anæmia is always well marked in this disease. Mental conditions also are frequently traceable in connection with its production. Morbid dread during pregnancy, insufficient to produce insanity before delivery, may develop into mental derangement after it. Shame and fear of exposure in unmarried women not unfrequently lead to it, as is evidenced by the fact that out of 2281 cases, gathered from the reports of various asylums, above 64 per cent. were unmarried.¹ Sudden moral shocks or vivid mental impressions may be the determining cause in predisposed persons. Gooch narrates an example of this in a lady who was attacked immediately after a fright produced by a fire close to her house, the hallucinations in this case being all connected with light; and Tyler Smith that of another whose illness dated from the sudden death of a relative. The age of the patient has some influence, and there seems to be a decidedly greater liability at advanced ages, especially when such women are pregnant for the first time.

¹ Journ. of Mental Science, 1870-71, p. 159.

Theory of its Dependence on Morbid State of the Blood.—The possibility of the acute form of puerperal insanity, coming on shortly after delivery, being dependent on some form of septicæmia is one which deserves careful consideration. The idea originated with Sir James Simpson, who found albumen in the urine of 4 patients. He suggested that this might probably indicate the presence in the blood of certain urinary constituents, which might have determined the attack, much in the same way as in eclampsia. Dr. Donkin subsequently wrote an important paper,¹ in which he warmly supported this theory, and arrived at the conclusion, "that the acute dangerous class of cases are examples of uræmic blood-poisoning, of which the mania, rapid pulse, and other constitutional symptoms are merely the phenomena; and that the affection, therefore, ought to be termed uræmic or renal puerperal mania, in contradistinction to the other form of the disease." He also suggests that the immediate poison may be carbonate of ammonia, resulting from the decomposition of urea retained in the blood. It will be observed, therefore, that the pathological condition producing puerperal mania would, supposing this theory to be correct, be precisely the same as that which, at other times, is supposed to give rise to puerperal eclampsia. There can be no doubt that the patient, immediately after delivery, is in a condition rendering her peculiarly liable to various forms of septic disease; and it must be admitted that there is no inherent improbability in the supposition that some morbid material circulating in the blood may be the effective cause of the attack, in a person otherwise predisposed to it. It is also certain, as I have already pointed out, that there are two distinct classes of cases, differing according to the period after delivery at which the attack comes on. Whether this difference depends on the presence in the blood of some septic matter—especially urinary excreta—is a question which our knowledge by no means justifies us in answering; it is, however, one which well merits further careful study.

Objections to this Theory.—It is only fair to point out some difficulties which appear to militate against the view which Dr. Donkin maintains. In the first place, the albuminuria is merely transient, while its supposed effects last for weeks or months. Sir James Simpson says, with regard to his cases: "I have seen all traces of albuminuria in puerperal insanity disappear from the urine within fifty hours of the access of the malady. The general rapidity of its disappearance is, perhaps, the principal, or, indeed, the only reason why this complication has escaped the notice of those physicians among us who devote themselves with such ardor and zeal to the treatment of insanity in our public asylums." This apparent anomaly Simpson attempts to explain by the hypothesis that, when once the uræmic poisoning has done its work, and set the disease in progress, the mania progresses of itself. This, however, is pure speculation; and, in the supposed analogous case of eclampsia, the albuminuria certainly lasts as long as its effects. It is not easy to understand, also, why uræmic poisoning should in one case give rise to insanity, and in another to convulsions. For all we know to the contrary, transient albuminuria may be much more common after delivery than has been generally supposed, and further investigation on this point is required. Albumen is by no means unfrequently observed in the urine, for a short time, in various conditions of the body, without any serious consequences, as, for example, after bathing; and we may too readily draw an unjustifiable conclusion from its detection in a few cases of mania. There are, however, many other kinds of blood-poisoning, besides uræmia, which may have an influence in the production of the disease, and it is to be hoped that future observations may enable us to speak with more certainty on this point.

Prognosis.—The prognosis of puerperal insanity is a point which will always deeply interest those who have to deal with so distressing a malady. It may resolve itself into a consideration of the immediate risk to life, and of the chances of ultimate restoration of the mental faculties. It is an old aphorism of Gooch's, and one the correctness of which is justified by modern experience, that "mania is more dangerous to life, melancholia to reason." It has very generally been supposed that the immediate risk to life in puerperal mania is not great, and, on the whole, this may be taken as correct. Take found that death took place, from all causes, in 10.9 of the cases under observation; these, however, were all women who had been admitted into asylums, and in whom the attack may be assumed to have been exceptionally severe. Great stress was laid by Hunter and Gooch on extreme rapidity of the pulse, as indicating a fatal tendency. There can be no doubt that it is a symptom of great gravity, but by no means one which need lead us to despair of our patient's recovery. The most dangerous class of cases are those attended with some inflammatory complication; and if there be marked elevation of temperature, indicating the presence of some such concomitant state, our prognosis must be more grave than when there is mere excitement of the circulation.

¹ Edin. Med. Journ., vol. vii.

Post-mortem Signs.—There are no marked post-mortem signs found in fatal cases to guide us in forming an opinion as to the nature of the disease. "No constant morbid changes," says Tyler Smith, "are found within the head, and most frequently the only condition found in the brain is that of unusual paleness and exsanguinity. Many pathologists have also remarked upon the extremely empty condition of the blood-vessels, particularly the veins."

Duration of the Disease.—The duration of the disease varies considerably. Generally speaking, cases of mania do not last so long as melancholia, and recovery takes place within a period of three months, often earlier. Very few of the cases admitted into the Edinburgh Asylum remained there more than six months, and after that time the chances of ultimate recovery greatly lessened. When the patient gets well, it often happens that her recollection of the events occurring during her illness is lost; at other times, the delusions from which she suffered remain, as, for example, in a case which was under my care, in which the personal antipathies which the patient formed when insane became permanently established.

Insanity of Lactation.—Fifty-four out of the 155 cases collected by Dr. Tuke were examples of the insanity of lactation, which would appear, therefore, to be nearly twice as common as that of pregnancy, but considerably less so than the true puerperal form. Its dependence on causes producing anæmia and exhaustion is obvious and well marked. In the large majority of cases, it occurs in multiparæ who have been debilitated by frequent pregnancies, and by length of nursing. When occurring in primiparæ, it is generally in women who have suffered from post-partum hæmorrhage, or other causes of exhaustion, or whose constitution was such as should have contra-indicated any attempt at lactation. The *bruit-de-diable* is almost invariably present in the veins of the neck, indicating the impoverished condition of the blood.

The type is far more frequently melancholic than maniacal, and when the latter form occurs, the attack is much more transient than in true puerperal insanity. The danger to life is not great, especially if the cause producing debility be recognized and at once removed.

There seems, however, to be more risk of the insanity becoming permanent than in the other forms. In 12 out of Dr. Tuke's cases the melancholia degenerated into dementia, and the patients became hopelessly insane.

Symptoms.—The symptoms of these various forms of insanity are practically the same as in the non-pregnant state.

Generally in cases of mania there is more or less premonitory indication of mental disturbance, which may pass unperceived. The attack is often preceded by restlessness and loss of sleep, the latter being a very common and well-marked symptom; or, if the patient do sleep, her rest is broken and disturbed by dreams. Causeless dislikes to those around her are often observed; the nurse, the husband, the doctor, or the child, becomes the object of suspicion, and, unless proper care be taken, the child may be seriously injured. As the disease advances, the patient becomes incoherent and rambling in her talk, and, in a fully-developed case, she is incessantly pouring forth an unconnected jumble of sentences, out of which no meaning can be made. Often some prevalent idea which is dwelling in the patient's mind can be traced running through her ravings, and it has been noticed that this is frequently of a sexual character, causing women of unblemished reputation to use obscene and disgusting language, which it is difficult to understand their even having heard. The tendency of such patients to make accusations impugning their own chastity was specially insisted on by many eminent authorities in a recent celebrated trial, when Sir James Simpson stated that in his experience "the organ diseased gave a type to the insanity, so that with women suffering from affections of the genital organs the delusions would be more likely to be connected with sexual matters." Religious delusions, as a fear of eternal damnation, or of having committed some unpardonable sin, are of frequent occurrence, but perhaps more often in cases which are tending to the melancholic type. There is generally intolerable restlessness, and the patient's whole manner and appearance are those of excessive excitement. She may refuse to remain in bed, may tear off her clothes, or attempt to injure herself. The suicidal tendency is often very marked. In one case under my care, the patient made incessant efforts to destroy herself, which were only frustrated by the most careful watching; she endeavored to strangle herself with the bedclothes, to swallow any article she could lay hold of, and even to gouge out her own eyes. Food is generally persistently refused, and the utmost coaxing may fail in inducing the patient to take nourishment. The pulse is rapid and small, and the more violent the excitement and furious the delirium, the more excited is the circulation. The tongue is coated and furred, the bowels constipated and disordered, and the fæces, as well as the urine, are frequently passed involuntarily. The urine is scanty and high-

colored, and, after the disease has lasted for some time, it becomes loaded with phosphates. The lochia, and the secretion of milk, generally become arrested at the commencement of the disease. The waste of tissue, from the incessant restlessness and movement of the patient, is very great; and, if the disease continue for some time, she falls into a condition of marasmus, which may be so excessive that she becomes wasted to a shadow of her former size.

Symptoms of Melancholia.—When the insanity assumes the form of melancholia, its advent is more gradual. It may commence with depression of spirits, without any adequate cause, associated with insomnia, disturbed digestion, headache, and other indications of bodily derangement. Such symptoms, showing themselves in women who have been nursing for a length of time, or in whom any other evident cause of exhaustion exists, should never pass unnoticed. Soon the signs of mental depression increase, and positive delusions show themselves. These may vary much in their amount, but they are all more or less of the same type, and very often of a religious character. The amount of constitutional disturbance varies much. In some cases which approach in character those of mania, there is considerable excitement, rapid pulse, furred tongue, and restlessness. Probably cases of acute melancholia, coming on during the puerperal state, most often assume this form. In others again there is less of these general symptoms, the patients are profoundly dejected, sit for hours without speaking or moving; but there is not much excitement, and this is the form most generally characterizing the insanity of lactation. In all cases there is a marked disinclination to food. There is also, almost invariably, a disposition to suicide; and it should never be forgotten, in melancholic cases, that this may develop itself in an instant, and that a moment's carelessness on the part of the attendants may lead to disastrous results.

Treatment.—Bearing in mind what has been said of the essential character of puerperal insanity, it is obvious that the course of treatment must be mainly directed to maintain the strength of the patient, so as to enable her to pass through the disease without fatal exhaustion of the vital powers, while we endeavor, at the same time, to calm the excitement and give rest to the disturbed brain. Any over-active measures—for example, bleeding, blistering the shaven scalp, and the like—are distinctly contra-indicated.

There is a general agreement on the part of the alienist physicians that in cases of acute mania the two things most needful are a sufficient quantity of suitable food and sleep.

Importance of Administering Nourishment.—Every endeavor should be made to induce the patient to take abundance of nourishment, to remedy the effects of the excessive waste of tissue, and support her strength until the disease abates. Dr. Blandford, who has especially insisted on the importance of this, says,¹ “Now, with regard to the food, skilful attendants will coax a patient into taking a large quantity, and we can hardly give too much. Messes of minced meat with potato and greens, diluted with beef-tea, bread and milk, rum and milk, arrow-root, and so on, may be got down. Never give mere liquids so long as you can get down solids. As the malady progresses, the tongue and mouth may become so dry and foul that nothing but liquids can be swallowed; but, reserving our beef-tea and brandy, let us give plenty of solid food while we can.”

Forcible Administration of Food.—The patient may, in mania as well as in melancholia, perhaps even more in the latter, obstinately refuse to take nourishment at all, and we may be compelled to use force. Various contrivances have been employed for this purpose. One of the simplest is introducing a dessert-spoon forcibly between the teeth, the patient being controlled by an adequate number of attendants, and slowly injecting into the mouth suitable nourishment, by an India-rubber bottle with an ivory nozzle, such as is sold by all chemists. Care must be taken not to inject more than an ounce at a time, and to allow the patient to breathe between each deglutition. So extreme a measure will seldom be required, if the patient have experienced attendants, who can overcome her resistance to food by gentler means; but it may be essential, and it is far better to employ it than to allow the patient to become exhausted from want of nourishment. In one case I had to feed a patient in this way three times a day for several weeks, and used for the purpose a contrivance known in asylums as Paley's feeding-bottle, which reduced the difficulty of the process to a minimum. Beef-tea, or strong soup, mixed with some farinaceous material, such as Revalenta Arabica, or wheat flour, or milk, forms the best mess for this purpose.

Stimulants.—In the early stages the patient is probably better without stimulants, which seem only to increase the excitement. As the disease progresses, and exhaustion

¹ Blandford, *Insanity and its Treatment*.

becomes marked, it may be necessary to have recourse to them. In melancholia they seem to be more useful, and may be administered with greater freedom.

State of the Bowels.—The state of the bowels requires especial attention. They are almost always disordered, the evacuations being dark and offensive in odor. In the early stages of the disease, the prompt clearing of the bowels by a suitable purgative sometimes has the effect of cutting short an impending attack. A curious example of this is recorded by Gooch, in which the patient's recovery seemed to date from the free evacuation of the bowels. A few grains of calomel, or a dose of compound jalap powder, or of castor oil, may generally be readily given. During the continuance of the illness the state of the primæ viæ should be attended to, and occasional aperients will be useful, but strong and repeated purgation is hurtful from the debility it produces.

The procuring sleep will necessarily form one of the most important points of treatment. For this purpose there is no drug so valuable as the hydrate of chloral, either alone, or in combination with bromide of potassium, which has a distinct effect in increasing its hypnotic action. Given in a full dose at bedtime, say 15 grs. to ʒss, it rarely fails in procuring at least some sleep, and, in an early stage of acute mania, this may be followed by the best effects. It may be necessary to repeat this draught night after night, during the acute stage of the malady. If we cannot induce the patient to swallow the medicine, it may be given in the form of enema.

Question of Administering Opium.—It is generally admitted that in mania preparations of opium, formerly much relied on in the treatment of the disease, are apt to do more harm than good. Dr. Blandford gives a strong opinion on this point. He says: "In prolonged delirious mania I believe opium never does good, and may do great harm. We shall see the effects of narcotic poisoning if it be pushed, but none that are beneficial. This applies equally to opium given by the mouth, and by subcutaneous injection. The latter, as it is more certain and effectual in producing good results, is also more deadly when it acts as a narcotic poison. After the administration of a dose of morphia by the subcutaneous method, the patient will probably at once fall asleep, and we congratulate ourselves that our long-wished-for object is attained. But after half an hour or so the sleep suddenly terminates, and the mania and excitement are worse than before. Here you may possibly think that had the dose been larger, instead of half an hour's sleep you would have obtained one of longer duration, and you may administer more, but with a like result. Large doses of morphia not merely fail to produce refreshing sleep; they poison the patient, and produce, if not the symptoms of actual narcotic poisoning, at any rate that typhoid condition which indicates prostration and approaching collapse. I believe there is no drug, the use of which more often becomes abused, than that of opium." It is otherwise in cases of melancholia, especially in the more chronic forms. In these opiates, in moderate doses, not pushed to excess, may be given with great advantage. The subcutaneous injection of morphia is by far the best means of exhibiting the drug, from its rapidity of action, and facility of administration.

Other Calmatives.—There are other methods of calming the excitement of the patient besides the use of medicines. The prolonged use of the warm bath, the patient being immersed in water at a temperature of 90° or 92° for at least half an hour, is highly recommended by some as a sedative. The wet pack serves the same purpose, and is more readily applied in refractory subjects.

Importance of Judicious Nursing.—Judicious nursing is of primary importance. The patient should be kept in a cool, well-ventilated, and somewhat darkened room. If possible she should remain in bed, or, at least, endeavors should be made to restrain the excessive restless motion, which has so much effect in promoting exhaustion. The presence of relatives and friends, especially the husband, has generally a prejudicial and exciting effect; and it is advisable to place the patient under the care of nurses experienced in the management of the insane, who, as strangers, are likely to have more control over her. It is not too much to say that much of the success in treatment must depend on the manner in which this indication is met. Rough, unskilled nurses who do not know how to use gentleness combined with firmness, will certainly aggravate and prolong the disorder. Inasmuch as no patient should be left unwatched by day or night, more than one nurse is essential.

Question of Removal to an Asylum.—The question of the removal of the patient to an asylum is one which will give rise to anxious consideration. As the fact of having been under such restraint of necessity fixes a certain lasting stigma upon a patient, this is a step which every one would wish to avoid if possible. In cases of acute mania, which will probably last a comparatively short time, home treatment can generally be efficiently carried out. Much must depend on the circumstances of the patient. If these be of a nature which preclude the possibility of her obtaining thoroughly efficient

nursing and treatment in her own home, it is advisable to remove her to a place where these essentials can be obtained, even at the cost of some subsequent annoyance. In cases of chronic melancholia, the management of which is on the whole more difficult, the necessity for such a measure is more likely to arise, and should not be postponed too late. Many examples of incurable dementia, arising out of puerperal melancholia, can be traced to unnecessary delay in placing the patients under the most favorable conditions for recovery.

Treatment during Convalescence.—When convalescence is commencing, change of air and scene will often be found of great value. Removal to some quiet country place, where the patient can enjoy abundance of air and exercise, in the company of her nurses, without the excitement of seeing many people, is especially to be recommended. Great caution must be used in admitting the visits of relatives and friends. In two cases under my own care the patients relapsed, when apparently progressing favorably, because the husbands insisted, contrary to advice, on seeing them. On the other hand, Gooch has pointed out that, when the patient is not recovering, when month after month has been passed in seclusion without any improvement, the visit of a friend or relative may produce a favorable moral impression, and inaugurate a change for the better. It is probably in cases of melancholia, rather than in mania, that this is likely to happen. The experiment may, under such circumstances, be worth trying; but it is one the result of which we must contemplate with some anxiety.

CHAPTER V.

PUERPERAL SEPTICÆMIA.

THERE is no subject in the whole range of obstetrics which has caused so much discussion and difference of opinion as that to which this chapter is devoted. Under the name of "*Puerperal Fever*," the disease we have to consider has given rise to endless controversy. One writer after another has stated his view of the nature of the affection with dogmatic precision, often on no other grounds than his own preconceived notions, and an erroneous interpretation of some of the post-mortem appearances. Thus, one states that puerperal fever is only a local inflammation, such as peritonitis; others declare it to be phlebitis, metritis, metro-peritonitis, or an essential zymotic disease *sui generis*, which affects lying-in women only. The result has been a hopeless confusion; and the student rises from the study of the subject with little more useful knowledge than when he began. Fortunately, modern research is beginning to throw a little light upon this chaos.

Modern View of the Disease.—The whole tendency of recent investigation is daily rendering it more and more certain that obstetricians have been led into error by the special virulence and intensity of the disease, and that they have erroneously considered it to be something special to the puerperal state, instead of recognizing in it a form of septic disease practically identical with that which is familiar to surgeons under the name of pyæmia or septicæmia.

Objection to the Name.—If this view be correct, the term "puerperal fever," conveying the idea of a fever such as typhus or typhoid, must be acknowledged to be misleading, and one that should be discarded as only tending to confusion. Before discussing at length the reasons which render it probable that the disease is in no way specific or peculiar to the puerperal state, it will be well to relate briefly some of the leading facts connected with it.

History of the Disease.—More or less distinct references to the existence of the so-called puerperal fever are met with in the classical authors, proving, beyond doubt, that the disease was well known to them; and Hippocrates, besides relating several cases, the nature of which is unquestionable, clearly recognizes the possibility of its originating in the retention and decomposition of portions of the placenta. Although Harvey and other writers showed that they were more or less familiar with it, and even made most creditable observations on its etiology, it was not until the latter half of the last century that it came prominently into notice. At that time the frightful mortality occurring in some of the principal lying-in hospitals, especially in the Hôtel

Dieu at Paris attracted attention; and ever since the disease has been familiar to obstetricians.

Mortality resulting from it in Lying-in Hospitals.—Its prevalence in hospitals in which lying-in women are congregated has been constantly observed both in this country and abroad, occasionally producing an appalling death-rate; the disease, when once it has appeared, frequently spreading from one patient to another, in spite of all that could be done to arrest it. It would be easy to give many startling instances of this. Thus it prevailed in London in the years 1760, 1768, and 1770, to such an extent that in some lying-in institutions nearly all the patients died. Of the Edinburgh Infirmary in 1773, it is stated that "almost every woman, as soon as she was delivered, or perhaps about twenty-four hours after, was seized with it, and all of them died, though every method was used to cure the disorder." On the Continent, where the lying-in institutions are on a much larger scale, the mortality was equally great. Thus in the *Maison d' Accouchements* of Paris, in a number of different years, sometimes as many as 1 in 3 of the women delivered died; on one occasion 10 women dying out of 15 delivered. Similar results were observed in other great Continental hospitals, as in Vienna, where, in 1823, 19 per cent. of the cases died, and, in 1842, 16 per cent.; and in Berlin, in 1862, hardly a single patient escaped, the hospital being eventually closed.

Such facts, the correctness of which is beyond any question, prove to demonstration the great risk which may accompany the aggregation of lying-in women. Whether they justify the conclusion that all lying-in hospitals should be abolished, is another and a very wide question, which can scarcely be satisfactorily discussed in a practical work. It is to be observed, however, that most of the cases in which the disease produced such disastrous results, occurred before our more recent knowledge of its mode of propagation was acquired, when no sufficient hygienic precautions were adopted, when ventilation was little thought of, and when, in a word, every condition prevailed that would tend to favor the spread of a contagious disease from one patient to another. More recent experience proves that when the contrary is the case (as for example in such an institution as the Rotunda Hospital in Dublin), the occurrence of epidemics of this kind may be entirely prevented, and the mortality approximated to that of home practice.

The Assumption of a Puerperal Miasm is Unnecessary.—The more closely the history of these outbreaks in hospitals are studied, the more apparent does it become that they are not dependent on any miasm necessarily produced by the aggregation of puerperal patients, but on the direct conveyance of septic matter from one patient to another.

In numerous instances the disease has been said to be generally epidemic in domiciliary practice, much in the same way as scarlet fever, or any other zymotic complaint might be. Such epidemics are described as having occurred in London in 1827-28, in Leeds in 1809-12, in Edinburgh in 1825, and many others might be cited. There is, however, no sufficient ground for believing that the disease has ever been epidemic in the strict sense of the word. That numerous cases have often occurred in the same place, and at the same time, is beyond question; but this can easily be explained without admitting an epidemic influence, knowing, as we do, how readily septic matter may be conveyed from one patient to another. In many of the so-called epidemics the disease has been limited to the patients of certain midwives or practitioners, while those of others have entirely escaped; a fact easily understood on the assumption of the disease being produced by septic matter conveyed to the patient, but irreconcilable with the view of general epidemic influence. We are not in possession of any reliable statistics of the mortality arising from puerperal septicæmia in ordinary general practice. It has, however, been well pointed out in the Report on Puerperal Fever, presented by the Obstetrical Society of Berlin to the Prussian Minister of Health,¹ that not only do the published returns of death from metria afford no reliable estimate of the actual mortality from this source, but that they are very far more numerous than deaths from any other cause in connection with pregnancy and childbirth.

Numerous Theories advanced regarding its Nature.—It would be a useless task to detail at length the theories that have been advanced to explain the disease. Indeed it may safely be held that the supposed necessity of providing a theory which would explain all the facts of the disease, has done more to surround it with obscurity than even the difficulties of the subject itself. If any real advance is to be made, it can only be by adopting an humble attitude, by admitting that we are only on the threshold of the inquiry, and by a careful observation of clinical facts, without drawing from them too positive deductions.

¹See Edinburgh Med. Journ., Nov., 1878.

Theory of its Local Origin.—Many have taught that the disease is essentially a local inflammation, producing secondary constitutional effects. This view doubtless originated from too exclusive attention to the morbid changes found on post-mortem examination. Extensive peritonitis, phlebitis, inflammation of the lymphatics, or of the tissues of the uterus, are very commonly found after death; and each of these has, in its turn, been believed to be the real source of the disease. This view finds but little favor with modern pathologists, and is in so many ways inconsistent with clinical facts, that it may be considered to be obsolete. No one of the conditions above mentioned is universally found, and in the worst cases, definite signs of local inflammation may be entirely absent. Nor will this theory explain the conveyance of the disease from one patient to another, or the peculiar severity of the constitutional symptoms.

Theory of an Essential Zymotic Fever.—A more admissible theory, and one which has been extensively entertained, is, that there is an essential zymotic fever peculiar to, and only attacking, puerperal women, which is as specific in its nature as typhus or typhoid, and to which the local phenomena observed after death bear the same relation that the pustules on the skin do to small-pox, or the ulcers in the intestinal glands to typhoid. This fever is supposed to spread by contagion and infection, and to prevail epidemically, both in private and in hospital practice. The most recent exponent of this view is Fordyce Barker, who, in his excellent work on the *Puerperal Diseases*, has entered at length into all the theories of the disease. He, like others who hold his opinions, has, I cannot but think, entirely failed to bring forward any conclusive evidence of the existence of such a specific fever. It is no doubt true that in typhus and typhoid, and other undoubted examples of this class of disease, there are well-marked local secondary phenomena; but then they are distinct and constant. He makes no attempt to prove that anything of the kind occurs in puerperal fever. On the contrary, probably there are no two cases in which similar local phenomena occur; nor is there any case in which the most practised obstetrician could foretell, either the course and duration of the illness, or the local phenomena. Again, this theory altogether fails to explain the very important class of cases which can be distinctly traced to sources originating in the patient herself, viz., the absorption of septic matter from decomposing coagula, and the like. Barker meets this difficulty by placing such cases of auto-infection under a separate category, admitting that they are examples of septicæmia. But he fails to show that there is any difference in symptomatology or post-mortem signs between them and the cases he believes to depend on an essential fever; nor would it be possible to distinguish the one from the other by either their clinical or pathological history.

Theory of Identity with Surgical Septicæmia.—The modern view which holds that the disease is, in fact, identical with the condition known as pyæmia or septicæmia, is by no means free from objections, and much patient clinical investigation is required to give a satisfactory explanation of certain peculiarities which the disease presents; but, in spite of these difficulties, which time may serve to remove, it offers a far better explanation of the phenomena observed than any other that has yet been advanced.

Nature of this View.—According to this theory, the so-called puerperal fever is produced by the absorption of septic matter into the system, through solutions of continuity in the generative tract, such as always exist after labor. It is not essential that the poison should be peculiar or specific; for, just as in surgical pyæmia, any decomposing organic matter, either originating within the generative organs of the patient herself, or coming from without, may set up the morbid action.

In describing the disease under discussion, I shall assume that, so far as our present knowledge goes, this view is the one most consonant with facts; but, bearing in mind that very little is yet known of surgical septicæmia, it must not be expected that obstetricians can satisfactorily explain all the phenomena they observe.

Basis of Description.—The best basis of description I know of, is that given by Burdon Sanderson, when he says, "in every pyæmic process you may trace a focus, a centre of origin, lines of diffusion or distribution, and secondary results from the distribution. In every case an initial process from which infection commences, from which the infection spreads, and secondary processes which come out of this primary one."¹ Adopting this division, I shall first treat of the mode in which the infection may commence in obstetric cases, and point out the special difficulties which this part of the subject presents.

Channels through which Septic Matter may be Absorbed.—The fact that all recently delivered women present lesions of continuity in the generative tract, through which septic matter, brought into contact with them, may be readily absorbed, has long been

¹ Clinical Transactions, vol. viii. p. cviii.

recognized. The analogy between the interior of the uterus after delivery and the surface of a stump after operation, was particularly insisted on by Cruveilhier, Simpson, and others; an analogy which was, to a great extent, based on erroneous conceptions of what took place, since they conceived that the whole interior of the uterus was bared. It is now well known that that is not the case; but the fact remains that at the placental site, at any rate, there are open vessels through which absorption may readily take place. That absorption of septic material occurs through this channel is probable in certain cases in which decomposing materials exist in the interior of the uterus, especially when, from defective uterine contraction, the venous sinuses are abnormally patulous, and are not occluded by thrombi. It is difficult to understand how septic matter, introduced from without, can reach the placental site. Other sites of absorption are, however, always available. These exist in every case in the form of slight abrasions or lacerations about the cervix, or in the vagina, or especially in primiparæ, about the fourchette and perinæum. There is even some reason to think that absorption of septic matter may take place through the mucous membrane of the vagina or cervix without any breach of surface. This might serve to account for the occasional, although rare cases, in which symptoms of the disease develop themselves before delivery, or so soon after it as to show that the infection must have preceded labor; nor is there any inherent improbability in the supposition that septic material may be occasionally absorbed through the unbroken mucous membrane, as is certainly the case with some poisons; for example, that of syphilis. Hence, there is no difficulty in recognizing the similarity of a lying-in woman to a patient suffering from a recent surgical lesion, or in understanding how septic matter conveyed to her, during or shortly after labor, may be absorbed. It is necessary, however, to suppose, that absorption takes place immediately or very shortly after these lesions of continuity are formed, for it is well known that the power of absorption is arrested after they have commenced to heal. This fact may explain the case in which sloughing about the perinæum or vagina exists without any septicæmia resulting, or the far from uncommon cases, in which an intensely fetid lochial discharge may be present a few days after delivery, without any infection taking place.

The character and sources of the septic matter constitute one of the most obscure questions in connection with septicæmia, and that which is most open to discussion.

The most practical division of the subject is into cases in which the septic matter originates within the patient, so that she infects herself, the disease then being properly *autogenetic*; and into those in which the septic matter is conveyed from without, and brought into contact with absorptive surfaces in the generative tract, the disease then being *heterogenetic*.

Sources of Self-infection.—The sources of auto-infection may be various, but they are not difficult to understand. Any condition giving rise to decomposition, either of the tissues of the mother herself, of matters retained in the uterus or vagina that ought to have been expelled, or decomposing matter derived from a putrid fœtus, may start the septicæmic process. Thus it may happen that from continuous pressure on the maternal soft parts during labor, sloughing has set in; or there may be already decomposing material present from some previous morbid state of the genital tracts, as in carcinoma. A more common origin is the retention of coagula, or of small portions of membrane, or of placenta, in the interior of the uterus, which have putrefied from access of air; or in the decomposition of the lochia. That the retention of portions of the placental tissue has at all times been the cause of septicæmia may be illustrated by the case of the Duchesse d'Orleans, in the time of Louis XIII., who had an easy labor, but died of child-bed fever. An examination was made by the leading physicians of Paris, in their report of which it was stated, "On the right side of the womb was found a small portion of after-birth, so firmly adherent that it could hardly be torn off by the finger nails."¹ The reason why self-infection does not more often occur from such sources, since more or less decomposition is of necessity so often present, has already been referred to in the fact that absorption of such matters is not apt to occur when the lesions of continuity, always existing after parturition, have commenced to heal. This observation may also serve to explain how previous bad states of health, by interfering with the healthy reparative process occurring after delivery, may predispose to self-infection. It is interesting to note that puerperal septicæmia, arising from such sources, is not limited to the human race. In the debate on pyæmia at the Clinical Society Mr. Hutchinson recorded several well-marked examples occurring in ewes, in whose uteri portions of retained placenta were found.

Source of Heterogenetic Infection.—The sources of septic matter conveyed from

¹ Louise Bourgeois, by Goodell.

without are much more difficult to trace, and there are many facts connected with heterogenetic infection which are very difficult to reconcile with theory, and of which, it must be admitted, we are not yet able to give a satisfactory explanation.

It is probable that any decomposing organic matter may infect, but that some forms operate with more certainty and greater virulence than others.

Influence of Cadaveric Poisoning.—One of these, which has attracted special attention, is what may be termed cadaveric poison, derived from dissection of the dead subject in the anatomical and post-mortem theatre, and conveyed to the genital tract by the hands of the accoucheur. Attention was particularly directed to this source of infection by the observations of Semmelweiss, who showed that in the division of the Vienna Lying-in Hospital attended by medical men and students who frequented the dissecting-rooms, the mortality was seldom less than 1 in 10, while in the division solely attended by women the mortality never exceeded 1 in 34; the number of deaths in the former division at once falling to that of the latter as soon as proper precautions and means of disinfection were used. Many other facts of a like nature have since been recorded, which render this origin of puerperal septicæmia a matter of certainty. An interesting example is related by Simpson with characteristic candor: "In 1836 or 1837, Mr. Sidey, of this city, had a rapid succession of five or six cases of puerperal fever in his practice, at a time when the disease was not known to exist in the practice of any other practitioners in the locality. Dr. Simpson, who had then no firm or proper belief in the contagious propagation of puerperal fever, attended the dissection of Mr. Sidey's patients, and freely handled the diseased parts. The next four cases of midwifery which Dr. Simpson attended were all affected with puerperal fever, and it was the first time he had seen it in practice. Dr. Patterson, of Leith, examined the ovaries, etc. The three next cases which Dr. Patterson attended in that town were attacked with the disease."¹ Negative examples are, of course, brought forward, of those who have attended post-mortem examinations without injury to their obstetric patients, which merely prove that the cadaveric poison does not, of necessity, attach itself to the hands of the dissector; and no amount of such testimony can invalidate such positive evidence as that just narrated. Barnes believes that there is not so much danger attending the dissection of patients who have died of any ordinary disease, but that the risk attending the dissection of those who have died of infectious or contagious complaints is very great indeed.² I presume there is no doubt that the risk is greater when the subject has died from zymotic disease; but the distinction is too delicate to rely on, and the attendant on midwifery will certainly err on the safe side by avoiding, as much as possible, having anything to do with the conduct of dissections or post-mortem examinations.

Infection from Erysipelas.—Another possible source of infection is erysipelatos disease in all its forms. The intimate connection between erysipelas and surgical pyæmia has long been recognized by surgeons, and the influence of erysipelas in producing puerperal septicæmia has been especially observed in surgical hospitals in which lying-in patients were also admitted. Trousseau relates instances of this kind occurring in Paris. The only instance that I know of in London was in the lying-in ward of King's College Hospital, where, in spite of every hygienic precaution, the mortality was so great as to necessitate the closure of the ward. Here the association of erysipelas with puerperal septicæmia was again and again observed; the latter proving fatal in direct proportion to the prevalence of the former in the surgical wards. The dependence of the two on the same poison was in one instance curiously shown by the fact of the child of a patient who died of puerperal septicæmia, dying from erysipelas which started from a slight abrasion produced by the forceps. A more recent and very remarkable example is related by Dr. Lombe Atthill.³ A patient suffering from erysipelas was admitted into the Rotunda Hospital on February 15, 1877. The sanitary condition of the hospital was at the time excellent. The patient was removed next day; but of the next 10 patients confined in adjoining wards, 9 were attacked with puerperal peritonitis, the only one who escaped being a case of abortion. But the connection between erysipelas and puerperal septicæmia is not limited to hospitals, having been often observed in domiciliary practice. Some interesting facts have been collected by Dr. Minor,⁴ who has shown that the two diseases have frequently prevailed together in various parts of the United States, and that during a recent outbreak of puerperal fever in Cincinnati, it occurred chiefly in the practice of those physicians who attended cases of erysipelas. Many children also died from erysipelas, whose mothers had died from puerperal fever.

¹ Selected Obst. Works, p. 508.

² "Lectures on Puerperal Fever," Lancet, vol. ii., 1865.

³ Medical Press and Circular, April, 1877.

⁴ Erysipelas and Childbed Fever. Cincinnati, 1874.

Infection from other Zymotic Diseases.—There is good reason to believe that the contagium of other zymotic diseases may produce a form of disease indistinguishable from ordinary puerperal septicæmia, and presenting none of the characteristic features of the specific complaint from which the contagium was derived. This is admitted to be a fact by the majority of our most eminent British obstetricians, although it does not seem to be allowed by Continental authorities, and it is strongly controverted by some writers in this country. It is certainly difficult to reconcile this with the theory of septicæmia, and we are not in a position to give a satisfactory explanation of it. I believe, however, that the evidence in favor of the possibility of puerperal septicæmia originating in this way is too strong to be assailable.

The scarlatinal poison is that regarding which the greatest number of observations have been made. Numerous cases of this kind are to be found scattered through our obstetric literature, but the largest number are to be met with in a paper by Dr. Braxton Hicks in the 12th volume of the *Obstetrical Transactions*, and they are especially valuable from that gentleman's well-known accuracy as a clinical observer. Out of 68 cases of puerperal disease seen in consultation, no less than 37 were distinctly traced to the scarlatinal poison. Of these 20 had the characteristic rash of the disease; but the remaining 17, although the history clearly proved exposure to the contagium of scarlet fever, showed none of its usual symptoms, and were not to be distinguished from ordinary typical cases of the so-called puerperal fever. On the theory that it is impossible for the specific contagious diseases to be modified by the puerperal state, we have to admit that one physician met with 17 cases of puerperal septicæmia in which, by a mere coincidence, the contagion of scarlet fever had been traced, and that the disease nevertheless originated from some other source; an hypothesis so improbable, that its mere mention carries its own refutation.

With regard to the other zymotic diseases the evidence is not so strong; probably from the comparative rarity of the diseases. Hicks mentions one case in which the diphtheritic poison was traced, although none of the usual phenomena of the disease were present. I lately saw a case in which a lady, a few days after delivery, had a very serious attack of septicæmia, without any diphtheritic symptoms, her husband being at the same time attacked with diphtheria of a most marked type. Here it would be difficult not to admit the dependence of the two diseases on the same poison.

It is, however, certain that all the zymotic diseases may attack a newly-delivered woman, and run their characteristic course without any peculiar intensity. Probably most practitioners have seen cases of this kind; and this is precisely one of the points of difficulty which we cannot at present explain, but on which future research may be expected to throw some light. It seems to me not improbable that the explanation of the fact that zymotic poison may in one puerperal patient run its ordinary course, and in another produce symptoms of intense septicæmia, may be found in the channel of absorption. It is at any rate comprehensible that if the contagium be absorbed through the skin or the ordinary channels, it may produce its characteristic symptoms, and run its usual course; while if brought into contact with lesions of continuity in the generative tract, it may act more in the way of septic poison, or with such intensity that its specific symptoms are not developed.

It may reasonably be objected that if puerperal and surgical septicæmia be identical, the zymotic poisons ought to be similarly modified when they infect patients after surgical operations. The subject of specific contagium as a cause of surgical pyæmia has been so little studied, that I do not think any one would be justified in asserting that such an occurrence is not possible. Fritsch, of Halle, and other German physicians have recently shown how elaborate antiseptic precautions in lying-in hospitals may prevent the origin of the disease from such sources. Sir James Paget, in his *Clinical Lectures*, seems to believe in the possibility of such modification. He says, "I think it not improbable that, in some cases, results occurring with obscure symptoms, within two or three days after operations, have been due to the scarlet-fever poison, hindered in some way from its usual progress." Mr. Spencer Wells informs me that he has seen cases of surgical pyæmia, which he had reason to believe originated in the scarlatinal poison; and his well-known success as an ovariologist is, no doubt, in a great measure to be attributed to his extreme care in seeing that no one, likely to come in contact with his patients, has been exposed to any such source of infection.

Septicæmia from Contagion conveyed from other Puerperal Patients.—The last source from which septic matter may be conveyed is from a patient suffering from puerperal septicæmia, a mode of origin which has, of late, attracted special attention. That this is the explanation of the occasional endemic prevalence of the disease in lying-in hospitals can scarcely be doubted. The theory of a special puerperal miasm

pervading the hospital is not required to account for the facts, for there are a hundred ways impossible to detect or avoid—on the hands of nurses or attendants, in sponges, bed-pans, sheets, or even suspended in the atmosphere—in which septic material, derived from one patient, may be carried to another.

The poison may be conveyed, in the same manner, from one private patient to another. Of this there are many lamentable instances recorded. Thus it was mentioned by a gentleman at the recent discussion at the Obstetrical Society, that 5 out of 14 women he attended died, no other practitioner in the neighborhood having a case. His origin of the disease was clearly pointed out by Gordon¹ towards the end of last century, who stated that he himself “was the means of carrying the infection to a great number of women,” and he also traced the spread of the disease in the same way in the practice of certain midwives. In some remarkable instances the unhappy property of carrying contagion has elung to individuals in a way which is most mysterious, and which has led to the supposition that the whole system becomes saturated with the poison. One of the strangest cases of this kind was that of Dr. Rutter, of Philadelphia, which caused much discussion. He had 45 cases of puerperal septicaemia in his own practice in one year, while none of his neighbors' patients were attacked. Of him it is related, “Dr. Rutter, to rid himself of the mysterious influence which seemed to attend upon his practice, left the city for ten days, and before waiting on the next parturient case had his hair shaved off, put on a wig, took a hot bath, and changed every article of his apparel, taking nothing with him that he had worn or carried, to his knowledge, on any former occasion: and mark the result. The lady, notwithstanding that she had an easy parturition, was seized the next day with child-bed fever, and died on the eleventh day after the birth of the child. Two years later he made another attempt at self-purification, and the next case attended fell a victim to the same disease.” No wonder that Meigs, in commenting on such a history, refused to believe that the doctor carried the poison, and rather thought that he was “merely unhappy in meeting with such accidents through God's providence.” It appears, however, that Dr. Rutter was the subject of a form of ozæna, and it is quite obvious that, under such circumstances, his hands never could have been free from septic matter.² [The Author quotes from the Editor. Dr. Rutter had an ozæna which in time much disfigured him from its effects upon the contour of his nose. He was unfortunately inoculated in his index finger from a patient, and neglected the pustule. He had 95 cases of puerperal septicaemia in 4 years and 9 months, with 18 deaths. The question of Dr. Meigs, who was a non-contagionist in regard to puerperal peritonitis, was remarkably apposite, “did he distil a subtle essence which he carried with him?”—ED.] This observation is of peculiar interest as showing that the sources of infection may exist in conditions difficult to suspect and impossible to obviate, and it affords a satisfactory explanation of a case which was for years considered puzzling in the extreme. It is quite possible that other similar cases, of which many are on record, although none so remarkable, may possibly have depended on some similar cause personal to the medical attendant.

The sources of septic poison being thus multifarious, a few words may be said as to the mode in which it may be conveyed to the patient.

Mode in which the Poison may be Conveyed to the Patient.—As on the view of puerperal septicaemia which seems most to agree with recorded facts, the poison, from whatever source it may be derived, must come into actual contact with lesions of continuity in the generative tract, it is obvious that one method of conveyance may be on the hands of the accoucheur. That this is a possibility, and that the disease has often been unhappily conveyed in this way, no one can doubt. Still it would be unfair in the extreme to conclude that this is the only way in which infection may arise. In town practice, especially, there are many other ways in which septic matter may reach the patient. The nurse may be the means of communication, and, if she have been in contact with septic matter, she is even more likely than the medical attendant to convey it when washing the genitals during the first few days after delivery, the time that absorption is most apt to occur. Barnes relates a whole series of cases occurring in a suburb of London, in the practice of different practitioners, every one of which was attended by the same nurse. Again septic matter may be carried in sponges, linen, and other articles. What is more likely, for example, than that a careless nurse might use an imperfectly washed sponge, on which discharge has been allowed to remain and decompose? Nor do I see any reason to question the possibility of infection from septic matter suspended in the atmosphere; and in lying-in hospitals, where many women are

¹ See Lectures on Puerperal Fever. By Robert J. Lee, M.D.

² This is stated on the authority of an obstetrical contemporary of Dr. Rutter. See Amer. Journ. of Med. Sciences, April, 1875, p. 471.

congregated together, there can be little doubt that this is a common origin of the disease. It is certain, whatever view we may take of the character of the septic material, that it must be in a state of very minute subdivision, and there is no theoretical difficulty in the assumption of its being conveyed by the atmosphere.

Conduct of the Practitioner in relation to the Disease.—This question naturally involves a reference to the duty of those who are unfortunately brought into contact with septic matter in any form, either in a patient suffering from puerperal septicæmia, zymotic disease, or offensive discharges. The practitioner cannot always avoid such contact, and it is practically impossible, as Dr. Duncan has insisted, to relinquish obstetric work every time that he is in attendance on a case from which contagion may be carried. Nor do I believe, especially in these days when the use of antiseptics is so well understood, that it is essential. It was otherwise when antiseptics were not employed; but I can scarcely conceive any case in which the risk of infection cannot be prevented by proper care. The danger I believe to be chiefly in not recognizing the possible risk, and in neglecting the use of proper precautions. It is impossible, therefore, to urge too strongly the necessity of extreme and even exaggerated care in this direction. The practitioner should accustom himself, as much as possible, to use the left hand only in touching patients suffering from infectious diseases, as that which is not used, under ordinary circumstances, in obstetric manipulations. He should be most careful in the frequent employment of antiseptics in washing his hands, such as Condy's fluid, carbolic acid, or tincture of iodine. Clothing should be changed on leaving the infectious case. Much more care than is usually practised should be taken by nurses, especially in securing perfect cleanliness in everything brought into contact with the patient. When, however, a practitioner is in actual and constant attendance on a case of puerperal septicæmia, when he is visiting his patient many times a day, especially if he be himself washing out the uterus with antiseptic lotions, it is certain that he cannot deliver other patients with safety, and he should secure the assistance of a brother practitioner, although there seems no reason why he should not visit women already confined, in whom he has not to make vaginal examinations.

Prophylaxis of Septicæmia.—If the views here inculcated as to the nature of, and mode of infection in, puerperal septicæmia be correct, it is obvious that much may be done in the way of prophylaxis. A perfectly aseptic management of puerperal women is practically impossible. In many lying-in institutions on the Continent, and in some in this country, very rigid rules have been laid down to prevent the possibility of infective matter being conveyed to the patient either on the hands of the attendants or on instruments, napkins, and the like, and, it is said, with very satisfactory results. As the risk is much greater when lying-in women are collected together, such precautions, which this is not the place to discuss, are absolutely indicated. They are not, however, applicable in ordinary private practice; but there are certain simple precautions which every one might adopt without trouble, which will materially lessen the risk of septic poisoning. Amongst these may be indicated the use of a lotion of 1 in 20 carbolic acid, with which the practitioner and nurse should always wash their hands before attending any case, or touching the genital organs; the use of carbolized oil, 1 in 8, for lubricating the fingers, catheter, forceps, etc.; syringing out the vagina night and morning with diluted Condy's fluid; rigid attention to cleanliness in bedding, napkins, etc. Precautions such as these, although they may appear to some frivolous and useless, indicate a recognition of danger and an endeavor to remove it, and if they were generally inculcated on nurses and others, might go far to prevent the occurrence of septic mischief.

Nature of the Septic Poison.—As to the precise character of the septic poison—although of late much has been said about it, and there is good reason to believe that further research may throw light on this obscure subject—too little is known to justify any positive statement. With regard to the influence of the minute organisms known as bacteria, and their supposed connection with the production of the disease, this is especially the case. Heberg has proved that they may be traced, in most cases of puerperal septicæmia, passing through the veins and lymphatics, and that they are found in various organs and pathological products. But what their relation is to the disease, whether they themselves form the septic matter, or carry it, or whether they are mere accidental concomitants of the pyæmic processes, it is impossible, in the present state of our knowledge, to state; and I, therefore, prefer to dwell on that part of the subject which is of clinical importance, rather than enter into speculative theories, which may to-morrow prove to be valueless.

Channels of Diffusion.—Passing on to the channels of diffusion through which the septic matter may act, we have to consider its effects on the structures with which it is brought into contact, and the mode in which it may infect the system at large; and this will include a consideration of the pathological phenomena.

Local changes consequent on the absorption of the poison are pretty constant, and of these we may form an intelligible idea by thinking of them as similar in character and causation to those which we have the opportunity of studying when septic matter is applied to a wound open to observation, as, for example, in cases of blood-poisoning following a dissection wound. Distinct traces of local action are not of invariable occurrence, and in some of the worst class of cases, when the amount of septic matter is great, and its absorption rapid, death may occur after an illness of short duration, but great intensity, and before appreciable local changes, either at the site of absorption or in the system at large, have had time to develop themselves. The fact that puerperal fever may prove fatal, without leaving any tangible post-mortem signs, has often been pointed out, such cases most frequently occurring during the endemic prevalence of the disease in lying-in hospitals. There can be little doubt, however, that in such cases of intense septicæmia marked pathological changes exist, in the form of alterations of the blood and degenerations of tissue, but not of a character which can be detected by an ordinary post-mortem examination. In the great majority of cases, indications of the disease exist at the site of absorption. These are described by pathologists as identical in their character with the inflammatory œdema which occurs in connection with phlegmonous erysipelas. If lacerations exist in the cervix or vagina they take on unhealthy action, the edges swell, and their surfaces become covered with a yellowish coat, similar in appearance to diphtheritic membrane. The mucous membrane of the uterus is also generally found to be affected, and in a degree varying with the intensity of the local septic process. There is evidence of severe endometritis; and, very frequently, the whole lining of the uterus is profoundly altered, softened, covered with patches of diphtheritic deposit, and it may be in a state of general necrosis. In the severer cases these changes affect the muscular tissue of the uterus, which is found to be swollen, soft, imperfectly contracted, and even partially necrosed, a condition which is likened by Heiberg to hospital gangrene. The connective tissue surrounding the generative tract is also swollen and œdematous, and the inflammation may in this way reach the peritonæum, although peritonitis, so often observed in puerperal septicæmia, does not necessarily depend on the direct transmission of inflammation from the pelvic connective tissue, but is more often a secondary phenomenon.

The channels through which general systemic infection may supervene are the lymphatics and the venous sinuses, the former being by far the most important. Recent researches have shown the great number and complexity of the lymphatics in connection with the pelvic viscera, and marked traces of the absorption of septic matter are almost always to be found, except in those very intense cases already alluded to, in which no appreciable post-mortem signs are discoverable. The septic matter is probably absorbed from the lymph spaces abounding in the connective tissue, and carried along the lymphatic canals to the nearest glands. The result is inflammation of their coats, and thrombosis of their contents, which may be seen on section as a creamy, purulent substance. The absorption of septic material may, as Virchow has shown, be delayed by the local changes produced in the lymphatics and in the glands with which they communicate, which are, therefore, conservative in their action; and the further progress of the case may in this way be stopped, and local inflammation alone result, such cases being believed by Heiberg to be examples of abortive pyæmia. On the other hand, the free septic material may be too abundant and intense to be so arrested, it may pass on through the lymph canals and glands, until it reaches the blood current through the thoracic duct, and so produces a general blood-infection. This mode of absorption of septic matter, and the tendency of the glands to arrest its further progress, serve to explain the progressive character of many cases in which fresh exacerbations seem to occur from time to time; since fresh quantities of poison, generated at its source of origin, may be absorbed as the case progresses. The uterine veins are supposed by D'Espine to be the channel of absorption in the intense form of disease which proves fatal very shortly after delivery, too soon for the more gradual process of lymphatic absorption to have become established. It is evident that the veins are not likely to act in this way, since they must, under ordinary circumstances, be completely occluded by thrombi, otherwise hæmorrhage would occur. If, however, uterine contraction be incomplete, the occlusion of the venous sinuses may be imperfect, and absorption of septic material through them may then take place. Some writers have laid great stress on imperfect uterine contraction in predisposing to septicæmia, and its influence may thus be well explained. The veins may bear an important part in the production of septicæmia, independent of the direct absorption of septic matter through them, by means of the detachment of minute portions of their occluding thrombi, in the form of emboli. If phlegmonous inflammation occur in the immediate vicinity of the veins, the thrombi they contain may become infected. When

once blood infection has occurred, by any of these channels, general septicæmia, the so-called puerperal fever, is developed.

Pathological Phenomena observed after general Blood-infection.—The variety of pathological phenomena found on post-mortem examination has had much to do with the prevalent confusion as to the nature of the disease. This has resulted in the description of many distinct forms of puerperal fever; the most marked pathological alteration having been taken to be the essential element of the disease. As a matter of fact there is no doubt that various types of pathological change are met with. Heiberg describes four chief classes which are by no means distinctly separated from one another, are often found simultaneously in the same subject, and are certainly not to be distinguished by the symptoms during life.

Intense Cases without marked Post-mortem Signs.—Of these, the first is the class of cases in which no appreciable morbid phenomena are found after death. This formidable and fatal form of the disease has long been well known, and is that described by some of our authors as adynamic, or malignant puerperal fever. It is the variety which was so prevalent in our lying-in hospital, and which Ramsbotham talks of as being second only to cholera in the severity and suddenness of its onset, and in the rapidity with which it carried off its victims. It is quite erroneous to suppose that the existence of pathological changes in this form of disease has never been recognized. Even with the coarse methods of examination formerly used, the occurrence of a fluid and altered state of the blood, and ecchymoses in connection with various organs—especially the lungs, spleen, and kidneys—were noticed and specially described by Copland in his dictionary of medicine. More recently it has been clearly proved by the microscope that there exist, in addition, the commencement of inflammation in most of the tissues, shown by cloudy swellings, and granular infiltration and disintegration of the cell elements; proving that the blood, heavily charged with septic matter, had set up morbid action whenever it circulated, the patient succumbing before this had time to develop.

Cases Characterized by Inflammation of the Serous Membranes.—In the second type, and that perhaps most commonly met with, the morbid changes are more frequently found in the serous membranes, in the pleura, the pericardium, but, above all, in the peritonæum, the alterations in which have long attracted notice, and have been taken by many writers as proving peritonitis to be the main element of the disease. Evidences of more or less peritonitis are very general. In the more severe cases there is little or no exudation of plastic lymph, such as is found in peritonitis unassociated with septicæmia. There is a greater or less quantity of brownish serum only, the coils of intestine, distended with flatus, and highly congested, being surrounded by it. More often there are patchy deposits of fibrinous exudation over many of the viscera, the fundus uteri, the under surface of the liver, and the distended intestine. There is then also a considerable quantity of sero-purulent fluid in the abdominal cavity. The pleural cavities may also exhibit similar traces of inflammatory action, containing imperfectly organized lymph, and sero-purulent fluid. Schroeder states that pleurisy is more often the direct result of transmission of inflammation through the substance of the diaphragm or lung, than a secondary consequence of the septicæmia. In like manner evidences of pericarditis may exist, the surface of the pericardium being highly injected, and its cavity containing serous fluid. Inflammation of the synovial membranes of the larger joints, occasionally ending in suppuration, is not uncommon, and may probably be best included under this class of cases.

Cases Characterized by Changes in the Mucous Membrane.—In the third type the mucous membranes appear to bear the brunt of the disease. The pathological changes are most marked in the mucous membrane lining the intestines, which is highly congested and even ulcerated in patches, with numerous small spots of blood extravasated in the sub-mucous tissue. Similar small apoplectic effusions have been observed in the substance of the kidneys and under the mucous membrane of the bladder. Pneumonia is of common occurrence. In most cases it is probably secondary to the impaction of minute emboli in the smaller branches of the pulmonary artery; but it may doubtless arise from independent inflammation of the lung tissue, and will then be included in the class of cases now under consideration.

Cases Characterized by the Impaction of Infected Emboli and Secondary Inflammation and Abscess.—The fourth class of pathological phenomena are those which are produced chiefly by the impaction of minute infected emboli in small vessels in various parts of the body. These are the cases which most closely resemble surgical pyæmia, both in their symptoms and post-mortem signs, and which by many writers are described under the name of puerperal pyæmia. The dependence of puerperal fever on phlebitis of the uterine veins was a favorite theory, and in a large proportion of cases the coats of the veins show signs of inflammation, their canals being occupied with

thrombi in a more or less advanced state of disintegration. The mode in which these thrombi may become infected has been shown by Babnoff, who has proved that leucocytes may penetrate the coats of the vein, and entering its contained coagulum, may set up disintegration and suppuration. This observation brings these pyæmic forms of disease into close relation with septicæmia, such as we have been studying, and justifies the conclusion of Verneuil that purulent infection is not a distinct disease, but only a termination of septicæmia, with which it ought to be studied. We have, moreover, to differentiate these results of embolism from those considered in a subsequent chapter; the characteristic of these cases being the infected nature of the minute emboli. Localized inflammations and abscesses, from the impaction of minute capillary emboli are found in many parts of the body; most frequently in the lungs, then in the kidneys, spleen, and liver, and also in the muscles and connective tissues. Pathologists are by no means agreed as to the invariable dependence of these on embolism, nor is it possible to prove their origin from this source by post-mortem examination. Some attribute all such cases to embolism, others think that they may be the results of primary septicæmic inflammation. It has been proved by Weber that minute infested emboli may pass through the lung capillaries; and this disposes of one argument against the embolic theory, based on the supposed impossibility of their passage. It is probable that both causes may operate, and that localized inflammations occurring a short time after delivery are directly produced by the infected blood, while those occurring after the lapse of some time, as in the second or third week, depend upon embolism.

Description of the Disease.—From what has been said as to the mode of infection in puerperal septicæmia, and as to the very various pathological changes which accompany it, it will not be a matter of surprise to find that the symptoms are also very various in different cases. This can readily be explained by the amount and virulence of the poison absorbed, the channel of infection, and the organs which are chiefly implicated; but it renders it very difficult to describe the disease satisfactorily.

The symptoms generally show themselves within two or three days after delivery. As infection most often occurs during labor, or, in cases which are autogenetic, within a short time afterwards, and before the lesions of continuity in the generative tract have commenced to cicatrize, it can be understood why septicæmia rarely commences later than the fourth or fifth day.

In the great majority of cases the disease begins insiduously. There are, generally, some chilliness and rigor, but by no means always, and even when present they frequently escape observation, or are referred to some transient cause. The first symptom which excites attention is a rise in the pulse, which may vary from 100 to 140 or more, according to the severity of the attack; and the thermometer will also show that the temperature is raised to 102°, or, in bad cases, even to 104° or 106°. Still, it must be borne in mind that both the pulse and temperature may be increased in the puerperal state from transient causes, and do not, of themselves, justify the diagnosis of septicæmia.

Symptoms of Intense Septicæmia.—In the more intense class of cases, in which the whole system seems overwhelmed with the severity of the attack, the disease progresses with great rapidity, and often without any appreciable indication of local complication. The pulse is very rapid, small, and feeble, varying from 120 to 140, and there is generally a temperature of 103° or 104°. There may be little or no pain, or there may be slight tenderness on pressure over the abdomen or uterus; and, as the disease progresses, the intestines get largely distended with flatus, so that intense tympanites often form a most distressing symptom. The countenance is sallow, sunken, and has a very anxious expression. As a rule, intelligence is unimpaired, and this may be the case even in the worst forms of the disease, and up to the period of death. At other times, there is a good deal of low muttering delirium, which often occurs at night alone, and alternates with intervals of complete consciousness, but is occasionally intensified, for a short time, into a more acute form. Diarrhœa and vomiting are of very frequent occurrence; by the latter dark, grumous, coffee-ground substances are ejected. The diarrhœa is occasionally very profuse and uncontrollable; in mild cases it seems to relieve the severity of the symptoms. The tongue is moist and loaded with sordes; but sometimes it gets dark and dry, especially towards the termination of the disease. The lochia are generally suppressed, or altered in character, and sometimes they have a highly offensive odor, especially when the disease is autogenetic. The breathing is hurried and panting, and the breath itself has a very characteristic, heavy, sweetish odor. The secretion of milk is often, but not always, arrested.

Duration of the Disease.—With more or less of these symptoms the case goes on;

and when it ends fatally it generally does so within a week, the fatal termination being indicated by more weakness, rapid, threadlike, or intermittent pulse, marked delirium, great tympanites, and sometimes a sudden fall of temperature, until at last the patient sinks with all the symptoms of profound exhaustion.

Variety of Symptoms in Different Cases.—In milder cases similar symptoms, variously modified and combined are present. It is seldom that two precisely similar cases are met with; in some the rapid, weak pulse is most marked; in others, abdominal distention, vomiting, diarrhœa, or delirium.

Symptoms of Peritonitis.—Local complications variously modify the symptoms and course of the disease. The most common is peritonitis, so much so that with some authors puerperal fever and puerperal peritonitis are synonymous terms. Here the first symptom is severe abdominal pain, commencing at the lower part of the abdomen, where the uterus is felt enlarged and tender. As the abdominal pain and tenderness spread, the sufferings of the patient greatly increase, the intestines become enormously distended with flatus, and the breathing is entirely thoracic, in consequence of the upward displacement of the diaphragm and the fact that the abdominal muscles are instinctively kept as much in repose as possible. The patient lies on her back, with her knees drawn up, and sometimes cannot bear the slightest pressure of the bed-clothes. There is generally much vomiting, and often severe diarrhœa. The temperature generally ranges from 102° to 104°, or even 106°, and is subject to occasional exacerbations and remissions, possibly depending on fresh absorption of septic matter. The case generally lasts for a week or more, the symptoms going on from bad to worse, and the patient dying exhausted. D'Espinne points out that rigors, with exacerbations of the general symptoms, not unfrequently occur about the sixth or seventh day, which he attributes to fresh systemic infection, from fetid pus in the peritoneal cavity. It must not be supposed that all these symptoms are necessarily present when the peritonic complication exists. Pain especially is often entirely absent, and I have seen cases in which post-mortem examination proved the existence of peritonitis in a very marked degree, in which pain was entirely absent. Sometimes the pain is only slight, and amounts to little more than tenderness over the uterus.

Other local complications are characterized by their own special symptoms; thus, pneumonia by dyspnœa, cough, dulness, etc.; pericarditis by the characteristic rub; pleurisy by dulness on percussion; kidney affection by albuminuria and the presence of casts; liver complication by jaundice; and so on.

Pyæmic Forms of the Disease.—The course of the disease is not always so intense and rapid, being, in some cases, of a more chronic character, and lasting many weeks. The symptoms in the early stage are often indistinguishable from those already described; and it is generally only after the second week that indications of purulent infection develop themselves. Then we often have recurrent and very severe rigors, with marked elevations and remissions of temperature. At the same time there is generally an exacerbation of the general symptoms, a peculiar yellowish discoloration of the skin, and occasionally well-developed jaundice. Transient patches of erythema are not uncommonly observed on various parts of the skin, and such eruptions have often been mistaken for those of scarlet fever or other zymotic disease. Localized inflammations and suppuration may rapidly follow. Amongst the most common are inflammation or even suppuration of the joints—the knees, shoulders, or hips—which is preceded by difficulty of movement, swelling, and very acute pain. Large collections of pus in various parts of the muscles and connective tissues are not rare. Suppurative inflammation may also be found in connection with many organs, as in the eye, in the pleura, pericardium, or lungs: each of which will, of course, give rise to characteristic symptoms, more or less modified by the type of the disease and the intensity of the inflammation.

Treatment.—In considering the all-important subject of treatment, the views of the practitioner are naturally biased by the theory he has adopted of the nature of the disease. If that here inculcated be correct, the indications we have to bear in mind are: 1st, to discover, if possible, the source of the poison, in the hope of arresting further septic absorption; 2d, to keep the patient alive until the effects of the poison are worn off; and 3d, to treat any local complications that may arise.

The Use of Antiseptic Injections.—The first is likely to be of great importance in cases of self-infection, as fresh quantities of septic matter may be, from time to time, absorbed. We, fortunately, are in possession of a powerful means of preventing further absorption, by the application of antiseptics to the interior of the uterus and to the canal of the vagina. This is especially valuable when the existence of decomposing coagula, or other sources of septic matter, is suspected in the uterine cavity, or when offensive discharges are present. Disinfection is readily accomplished by washing out the

uterine cavity, at least twice daily, by means of a Higginson's syringe with a long vaginal pipe attached.¹ The results are sometimes very remarkable, the threatening symptoms rapidly disappearing, and the temperature and pulse falling so soon after the use of the antiseptic injections as to leave no doubt of the beneficial effects of the treatment. I cannot better illustrate the advantages of this treatment than by the accompanying temperature chart, which is from a case which came under my observation in the out-door practice of King's College Hospital. It was that of a healthy woman, thirty-six years of age, who had an easy and natural labor. Nothing remarkable was observed until the 3d day after delivery, when the temperature was found to be slightly increased. On the morning of the 8th day the temperature had risen to 105.4°. She was delirious, with a rapid, thready pulse, clammy perspiration, tympanitic abdomen, and her general condition indicated the most urgent danger. On vaginal examination, a piece of compressed and putrid placenta was found in the os. This was removed by my colleague, Dr. Hayes, and the uterus thoroughly washed out with Condé's fluid and water. The same evening the temperature had sunk to 99°, and the general symptoms were much improved. The next day there was a slight return of offensive discharge, and an aggravation of the symptoms. After again washing out the uterus the temperature fell, and from that date the patient convalesced without a single bad symptom.

This is a very well-marked example of the value of local antiseptic treatment, and I have seen many cases of the same kind. It should, therefore, never be omitted in all cases in which self-infection is possible; and, indeed, even when there is no reason to suspect the presence of a local focus of infection, the use of antiseptic lotions is advisable, as a matter of precaution, since it can do no harm, and is generally comforting to the patient. Any antiseptic may be used, such as a weak solution of carbolic acid, 1 in 50, or of tincture of iodine, or Condé's fluid largely diluted. I generally use the two latter alternately, the one in the morning, the other in the evening. The nozzle of the syringe should be guided well through the cervix, and the cavity of the uterus thoroughly washed out, until the fluid that issues from the vagina is no longer discolored. As the os is always patulous, there is no risk of producing the troublesome symptoms of uterine colic which occasionally follow the use of intra-uterine injections in the unimpregnated state. It is quite useless to entrust the injection to the nurse, and it should be performed at least twice daily by the practitioner himself, in all cases in which the discharges are offensive.

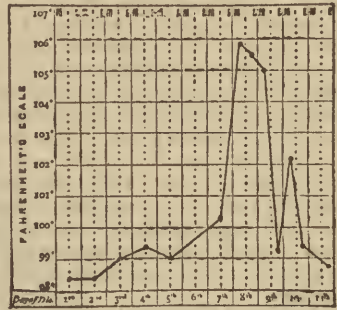
Administration of Food and Stimulants.—In a disease characterized by so marked a tendency to prostration, the importance of sustaining the vital powers by an abundance of easily assimilated nourishment cannot be overrated. Strong beef-tea, or other forms of animal soup, milk, alone or mixed either with lime or soda water, and the yolk of eggs, beat up with milk and brandy, should be given at short intervals, and in as large quantities as the patient can be induced to take; and the value of thoroughly efficient nursing will be specially apparent in the management of this important part of the treatment. As there is frequently a tendency to nausea, the patient may resist the administration of food, and the resources of the practitioner will be taxed in administering it in such form and variety as will prove least distasteful. Generally speak-

¹ My colleague, Dr. Hayes, has invented a silver tube for the purpose of administering such intra-uterine injections (Fig. 2), which answers its purpose admirably. The numerous apertures at its extremity allow of a number of minute streams of fluid being thrown out in the form of a

FIG. 2.



spray over the interior of the uterus, the complete bathing of its surface and washing out of its cavity being thus insured. It is, moreover, introduced more easily than the ordinary vaginal pipe, and can be attached to a Higginson syringe.



ing, not more than one or two hours should be allowed to elapse without some nutriment being given. The amount of stimulant required will vary with the intensity of the symptoms and the indications of debility. Generally, stimulants are well borne, prove decidedly beneficial, and require to be given pretty freely. In cases of moderate severity a tablespoonful of good old brandy or whiskey every four hours may suffice; but when the pulse is very rapid and thready, when there is much low delirium, tympanites, or sweating (indicating profound exhaustion), it may be advisable to give them in much larger quantities and at shorter intervals. The careful practitioner will closely watch the effects produced, and regulate the amount by the state of the patient, rather than by any fixed rule; but in severe cases, eight or twelve ounces of brandy, or even more, in the twenty-four hours, may be given with decided benefit.

*Venesection not Admissible.*¹—Venesection, both general and local, was long considered a sheet-anchor in this disease. Modern views are, however, entirely opposed to its use; and in a disease characterized by so profound an alteration of the blood, and so much prostration, it is too dangerous a remedy to employ, although it is possible that it might alleviate temporarily the severity of some of the symptoms, especially in cases in which peritonitis is well marked, and much local pain and tenderness are present.

Medicinal Treatment.—The rational indications in medicinal treatment are to lessen the force of the circulation as much as is possible without favoring exhaustion, and to diminish the temperature.

Use of Arterial Sedatives.—For the former purpose, Barker strongly advocates the use of *veratrum viride*, in doses of five drops of the tincture every hour, until the pulse falls below 100, when its effects are subsequently kept up by two or three drops every second hour. Of this drug I have no personal experience; but I have extensively used minute doses of tincture of aconite for the same purpose, and, when carefully given, I believe it to be a most valuable remedy. The way I have administered it is to give a single drop of the tincture, at first every half hour, increasing the interval of administration according to the effect produced. Generally, after giving four or five doses at intervals of half an hour, the pulse begins to fall, and afterwards a few doses, at intervals of one or two hours, will suffice to prevent the heart's action rising to its former rapidity. The advantage of thus modifying cardiac action, with the view of preventing excessive waste of tissue, cannot be questioned. It is evident that so powerful a remedy must not be used without the most careful supervision, for, if continued too long or given at too frequent intervals, it may unduly depress the circulation, and do more harm than good. It is necessary, therefore, that the practitioner should constantly watch the effect of the drug, and stop it if the pulse become very weak, or if it intermit. It is most likely to be useful at an early stage of the disease before much exhaustion is present, and then only when the pulse is of a certain force and volume. Barker says of the *veratrum viride*, what is also true of aconite, that "it should not be given in those cases in which rapid prostration is manifested by a feeble, threadlike, irregular pulse, profuse sweats, and cold extremities."

Reduction of Temperature.—The reduction of temperature must form an important part of our treatment, and for this purpose many agents are at our disposal.

Quinine in large doses, of from 10 to 20 grains, has been much used for this purpose, especially in Germany. After its exhibition the temperature frequently falls one or two degrees. It may be given morning and evening. Unpleasant head-symptoms, deafness, and ringing in the ears often render its continuance for a length of time impossible; these may, however, be much lessened by the addition of 10 to 15 minims of hydrobromic acid to each dose.

Salicylic acid, in doses of from 10 to 20 grains, or the salicylate of soda in the same doses, is a valuable antipyretic, which I have found on the whole more manageable than quinine. Under its use the temperature often falls considerably in a short space of time. It is, however, apt to depress the circulation, and thus requires to be

[¹ I believe that the entire abandonment of venesection has been a grave error, and that where there is early in the attack a high pulse, with great abdominal distention and tenderness, and a decided elevation of temperature, we ought to bleed the patient sitting, at once, and to such a degree as to produce a decided impression. One of the worst cases I ever saw, was cured in this way. The woman was delivered at 3½ P.M. of one day, and the disease manifested itself in twenty hours. At 9 the next morning she was apparently doing well; at 1 she was in great suffering, and could not bear her abdomen to be touched; vs. 13xvj; at 9 P.M., symptoms more grave; vs. 13xi in a sitting posture until she felt sick. At 10 P.M., pulse 150; in twenty-four hours from this, no fever and very little pain; in three days, regarded as out of danger. Saw her in robust health, with her child living, a year later.—Ed.]

carefully watched while it is being administered, and, should the pulse become very small and feeble, it should be discontinued.

Warburg's Tincture.—In some cases, especially when the fever has assumed a remittent type, I have administered, with marked benefit, a drug which is of high repute in India in the worst class of malarious remittent fevers, and the almost marvellous effects of which, in such cases, I had myself witnessed in India many years ago. This is the so-called Warburg's tincture, the value of which has been testified to by many high authorities, among whom I may mention Dr. Maclean, of Netley, Dr. Broadbent, and Sir Alexander Armstrong, the Director-General of the Medical Department of the Navy, who informs me that it is now supplied to all Her Majesty's ships in the tropics, because it is found to be of the utmost value in cases in which quinine has little or no effect.

Recently its composition has been made public by Dr. Maclean. The basis is quinine, in combination with various aromatics and bitters, some of which probably intensify its action. Be this as it may, the testimony in favor of the antipyretic action of the remedy is very strong. I have found its exhibition followed by a profuse diaphoresis (this being its almost invariable effect), and sometimes a rapid amelioration of the symptoms. In other cases in which I have tried it, like everything else, it has proved of no avail.

Application of Cold.—Cold may be advantageously tried in suitable cases. The simplest mode of using it is by Thornton's ice-cap, by which a current of cold water is kept continuously running round the head. This has been found of great value in pyrexia after ovariectomy, and I have also found it useful as a means of reducing temperature in puerperal cases. It is a comforting application, and gives great relief to the throbbing headache, which often causes much suffering. Under its use the temperature often falls two or more degrees, and it is easily continued day or night.

In very serious cases, when the temperature reaches 105° and upwards, the external application of cold to the rest of the body may be tried. I have elsewhere related a case of puerperal septicæmia with hyperpyrexia, the temperature continuously ranging over 105°, in which I kept the patient for eleven days¹ nearly continuously covered with cloths soaked in iced water, by which means only was the temperature kept within moderate bounds, and life preserved. But this method of treatment is excessively troublesome, and is in no way curative. It is only of use in moderating the temperature when it has reached a point at which it could not continue long without destroying the patient. I should, therefore, never think of employing it unless the temperature was over 105°, and then only as a temporary expedient, requiring incessant watching, to be desisted from as soon as the temperature had reached a more moderate height. It is clearly impossible to place a puerperal patient in a bath, as is practised in hyperpyrexia associated with acute rheumatism. The same effect may, however, be obtained by placing her on Mackintosh sheeting, and covering the body with towels soaked in iced water, which are frequently renewed by the attendant nurses. During the application the temperature should be constantly taken, and as soon as it has fallen to 101° the cold applications should be discontinued.

Administration of Turpentine.—Amongst other remedies which have been used is turpentine, which was highly thought of by the Dublin school. In cases with much tympanitic distention and a small, weak pulse it is sometimes of unquestionable value, and it probably acts as a strong nerve stimulant. Given in doses of 15 to 20 minims, rubbed up with mucilage, it can generally be taken in spite of its nauseous taste.

Evacuant Remedies.—Purgatives, diaphoretics, or even emetics, have often been employed as eliminants of the poison. The former are strongly recommended by Schroeder and other German authorities, and in this country they were formerly amongst the most favorite remedies, and there is a general concurrence of opinion amongst our oldest writers as to their value. In the first volume of the *Obstetrical Journal*, there is a paper by Mr. Morton, in which this practice is strongly advocated, and some interesting cases are recorded in which it apparently acted well. He administers calomel in doses of 3 or 4 grains with compound extract of colocynth, so as to keep up a free action of the bowels. It seems quite reasonable, when there is constipation, to promote a gentle action of the bowels by some mild aperient; but, bearing in mind that severe and exhausting diarrhœa is a common accompaniment of the disease, I should myself hesitate to run the risk of inducing it artificially, especially as there is no proof whatever that septic matter can really be eliminated in this way. At the commencement of the disease, however, I have often given one or two aperient doses of calomel with decided benefit.

¹A Lecture on a case of Puerperal Septicæmia, with Hyperpyrexia, treated by the continuous application of Cold.—*Brit. Med. Journ.*, Nov. 17, 1877.

Internal Antiseptic Remedies.—It is possible that further research will give us some means of counteracting the septic state of the blood, and the sulphites and carbolates have been given for this purpose, but as yet with no reliable results.

Tincture of Perchloride of Iron.—The tincture of the perchloride of iron naturally suggests itself, from its well-known effects in surgical pyæmia. In the less intense forms of the disease, especially when local suppurations exist, it is certainly useful, and may be given in doses of 10 to 20 minims every 3 or 4 hours. In very acute cases other remedies are more reliable, and the iron has the disadvantage of not unfrequently causing nausea or vomiting.

Opiates.—When restlessness, irritation, and want of sleep are prominent symptoms, sedatives may be required. Under such circumstances opiates may be given at night, and Battley's solution, nupenthe, or the hypodermic injection of morphia, are the forms which answer best.

Treatment of Local Complications.—Pain and tenderness, and local complications, must be treated on general principles. The distress from them is most experienced when peritonitis is well marked. Then warm and moist applications, in the form of poultices or fomentations, are very useful. Relief is also sometimes obtained from turpentine stupes, and, when the tympanites is distressing, turpentine enemata are very serviceable. I have found the free application over the abdomen of the flexible colloidum of the pharmacopœia decidedly useful in alleviating the suffering from peritonitis.

Such are the remedies most used in the treatment of this disease. It is needless to say that it is quite impossible to lay down fixed rules for the management of any individual case; and it is obvious that, if puerperal septicæmia be not a special and distinct disease, its judicious management must depend on the general knowledge of the attendant, and on a careful study of the symptoms each separate case presents.

CHAPTER VI.

PUERPERAL VENOUS THROMBOSIS AND EMBOLISM.

UNDER the head of *thrombosis* we may class several important diseases connected with the puerperal state, which have received far less attention than they deserve. It is only of late years that some, we may probably safely say the majority, of those terribly sudden deaths which from time to time occur after delivery, have been traced to their true cause, viz., obstruction of the right side of the heart and pulmonary arteries from a blood-clot, either carried from a distance, or, as I shall hope to show, formed *in situ*. Although the result, and, to a great extent, the symptoms, are identical in both, still a careful consideration of the history of these two classes of cases tends to show that in their causation they are distinct, and that they ought not to be confounded. In the former, we have primarily a clotting of blood in some part of the peripheral venous system, and the separation of a portion of such a thrombus due to changes undergone during retrograde metamorphosis tending to its eventual absorption. In the latter we have a local deposition of fibrine, the result of blood changes consequent on pregnancy and the puerperal state. The formation of such a coagulum in vessels, the complete obstruction of which is incompatible with life, explains the fatal results. When, however, a coagulum chances to be formed in more distant parts of the circulation, the vital functions are not immediately interfered with, and we have other phenomena occurring, due to the obstruction. The disease known as *phlegmasia dolens*, I shall presently attempt to show, is one result of blood-clot forming in peripheral vessels. But from the evident and tangible symptoms it produces it has long been considered an essential and special disease, and the general blood dyscrasia which produces it, as well as other allied states, has not been studied separately. I shall hope to show that all these various conditions, dissimilar as they at first sight appear, are very closely connected, and that they are in fact due to a common cause; and thus, I think, we shall arrive at a clearer and more correct idea of their true nature, than if we looked upon them as distinct and separate affections, as has been commonly done. I am aware that in *phlegmasia dolens*, the pathology of which has received perhaps more study than that of almost any other puerperal affection, something beyond simple obstruction of the venous system of the affected limb is probably required to account for

the peculiar tense and shining swelling which is so characteristic. Whether this be an obstruction of the lymphatics, as Dr. Tilbury Fox and others have maintained with much show of reason, or whether it is some as yet undiscovered state, further investigation is required to show. But it is beyond any doubt that the important and essential part of the disease is the presence of a thrombus in the vessels; and I think it will not be difficult to prove that in its causation and history it is precisely similar to the more serious cases in which the pulmonary arteries are involved.

It will be well to commence the study of the subject by a consideration of the conditions which, in the puerperal state, render the blood so peculiarly liable to coagulation, and we may then proceed to discuss the symptoms and results of the formation of coagula in various parts of the circulatory system.

Conditions which favor Thrombosis.—The researches of Virchow, Benjamin Ball, Humphrey, Richardson, and others, have rendered us tolerably familiar with the conditions which favor the coagulation of the blood in the vessels. These are chiefly: 1. A stagnant or arrested circulation; as, for example, when the blood coagulates in the veins which draw blood from the gluteal region in old and bed-ridden people, or as in some forms of pulmonary thrombosis, in which the clots in the arteries are probably the result of obstruction in the circulation through the lung-capillaries, as in certain cases of emphysema, pneumonia, or pulmonary apoplexy. 2. A mechanical obstruction around which coagula form, as in certain morbid states of the vessels, or, a better example still, secondary coagula which form around a travelled embolus impacted in the pulmonary arteries. 3. And most important of all, in which the coagulation is the result of some morbid state of the blood itself. Examples of this last condition are frequently met with in the course of various diseases, such as rheumatism or fever, in which the quantity of fibrine is increased, and the blood itself is loaded with morbid material. Thrombosis from this cause is of by no means infrequent occurrence after severe surgical operations, especially such as have been attended with much hæmorrhage, or when the patient is in a weak and anæmic condition. This has been specially dwelt upon as a not infrequent source of death after operation by Fayrer and other surgeons.¹

Conditions which favor Coagulation in the Puerperal State.—But little consideration is required to show why thrombosis plays so important a part in the puerperal state, for there most of the causes favoring its occurrence are present. Probably there is no other condition in which they exist in so marked a degree, or are so frequently combined. The blood contains an excess of fibrine, which largely increases in the latter months of utero-gestation, until, as has been pointed out by Andral and Gavarret, it not unfrequently contains a third more than the average amount present in the non-pregnant state. As soon as delivery is completed, other causes of blood dyscrasia come into operation. Involution of the largely hypertrophied uterus commences, and the blood is charged with a quantity of effete material, which must be present, in greater or less amount, until that process is completed. It is an old observation that phlegmasia dolens is of very common occurrence in patients who have lost much blood during labor; thus Dr. Leishman says: "In no class of cases has it been so frequently observed as in women whose strength has been reduced to a low ebb by hæmorrhage either during or after labor; and this, no doubt, accounts for the observation made by Merriman, that it is relatively a common occurrence after placenta prævia."² An examination of the cases in which death results from pulmonary thrombosis shows the same facts, as in a large proportion of them severe post-partum hæmorrhage has occurred. The exhaustion following the excessive losses so common after labor must of itself strongly predispose to thrombosis, and, indeed, loss of blood has been distinctly pointed out by Richardson to be one of its most common antecedents. "There is," he observes, "a condition which has been long known to favor coagulation and fibrinous deposition. I mean loss of blood, and syncope or exhaustion during impoverished states of the body."

Since, then, so many of the predisposing causes of thrombosis are present in the puerperal state, it is hardly a matter of astonishment that it should be of frequent occurrence, or that it should lead to conditions of serious gravity. And yet the attention of the profession has been for the most part limited to a study of one only of the results of this tendency to blood-clotting after delivery, no doubt because of its comparative frequency and evident symptoms. True, the balance of professional opinion has lately held that phlegmasia dolens is chiefly the result of some morbid condition of the blood producing plugging of the veins; but the wider view which I am attempting to maintain, which would bring this disease into close relation with the more rarely observed, but infinitely important, obstructions of the pulmonary arteries, has scarcely, if at all,

¹ Edin. Med. Journ., March, 1861; Indian Annals of Med., July, 1867.

² Leishman, System of Obstetrics, p. 710.

been insisted on. Doubtless further investigation will show that it is not in these parts of the venous system alone that puerperal thrombosis occurs; but the symptoms and effects of venous obstruction elsewhere, important though they may be, are unknown.

I propose, then, to describe the symptoms and pathology of blood-clot in the right side of the heart and pulmonary artery. It may be useful here to repeat that this is essentially distinct from embolism of the same parts. The latter is obstruction due to the impaction of a separated portion of a thrombus formed elsewhere, and for its production it is essential that thrombosis should have preceded it. Embolism is in fact an accident of thrombosis, not a primary affection. The condition we are now discussing I hold to be primary, precisely similar in its causation to the venous obstruction which, in other situations, gives rise to phlegmasia do'ens.

At the threshold of this inquiry we have to meet the objection, started by several who have written on this subject,¹ that spontaneous coagulation of the blood, in the right side of the heart and pulmonary arteries, is a mechanical and physiological impossibility. This was the view of Virchow, who, with his followers, maintained that whenever death from pulmonary obstruction occurred, an embolus was of necessity the starting-point of the malady, and the nucleus round which secondary deposition of fibrine took place. Virchow holds that the primary factor in thrombosis is a stagnant state of the blood, and that the impulse imparted to the blood by the right ventricle is of itself sufficient to prevent coagulation. It is to be observed that these objections are purely theoretical. Without denying that there is considerable force in the arguments adduced, I think that the clinical history of these cases strongly favors the view of spontaneous coagulation; and I would apply to the theoretical objections advanced the argument used by one of their strongest upholders, with regard to another disputed point, "Je préfère laisser la parole aux faits, car devant eux la théorie s'incline."²

The anatomical arrangement of the pulmonary arteries shows how spontaneous coagulation may be favored in them; for, as Dr. Humphrey has pointed out,³ "the artery breaks up at once into a number of branches, which radiate from it, at different angles, to the several parts of the lungs. Consequently, a large extent of surface is presented to the blood, and there are numerous angular projections into the currents; both of which conditions are calculated to induce the spontaneous coagulation of the fibrine." We know also, that thrombosis generally occurs in patients of feeble constitution, often debilitated by hæmorrhage, in whom the action of the heart is much weakened. These facts, of themselves, go far to meet the objections of those who deny the possibility of spontaneous coagulation at the roots of the pulmonary arteries.

Results of Post-mortem Examinations.—The records of post-mortem examinations show also, that in many of the cases the right side of the heart, as well as the larger branches of the pulmonary arteries, contained firm, leathery, decolorized, and laminated coagula, which could not have been recently formed. The advocates of the purely embolic theory maintain that these are secondary coagula, formed around an embolus. But surely the mechanical causes which are sufficient to prevent spontaneous deposition of fibrine, would also suffice to prevent its gathering round an embolus; unless, indeed, the obstruction was sufficient to arrest the circulation altogether, when death would occur before there was any time for secondary deposit. Before we can admit the possibility of embolism, we must have at least one factor, that is, thrombosis in a peripheral vessel, from which an embolus can come. In many of the recorded cases nothing of the kind was found, and although, as is argued, this may have been overlooked, yet such an oversight can hardly always have been made.

The strongest argument, however, in favor of the spontaneous origin of pulmonary thrombosis, is one which I originally pointed out in a series of papers "On thrombosis and embolism of the pulmonary artery as a cause of death in the puerperal state."⁴ I there showed, from a careful analysis of 25 cases of sudden death, after delivery, in which accurate post-mortem examination had been made, that cases of spontaneous thrombosis and embolism may be divided from each other by a clear line of demarcation, depending on the period after delivery at which the fatal result occurs. In 7 out of these cases there was distinct evidence of embolism, and in them death occurred at a remote period after delivery; in none before the nineteenth day. This contrasts remarkably with the cases in which the post-mortem examination afforded no evidence of embolism. These amounted to 15 out of the 25, and in all of them, with one exception, death occurred before the fourteenth day, often on the second or third. The reason of this seems to be that in the former, time is required to admit of degenerative changes taking place in the deposited fibrine leading to separation of an embolus;

¹ See especially Bertin, *Des Embolies*, p. 46 et seq.

² Bertin, *Des Embolies*, p. 149.

³ Humphrey, *On the Coagulation of the Blood in the Venous System during Life*. ⁴ *Lancet*, 1867.

while in the latter, the thrombosis corresponds in time, and to a great extent, no doubt, also, in cause, to the original peripheral thrombosis from which, in the former, the embolus was derived. Many cases I have since collected illustrate the same rule in a very curious and instructive way.

Another clinical fact I have observed, points to the same conclusion. In one or two cases, distinct signs of pulmonary obstruction have shown themselves, without proving immediately fatal, and shortly *afterwards*, peripheral thrombosis, as evidenced by phlegmasia dolens of one extremity, has commenced. Here the peripheral thrombosis obviously followed the central, both being produced by identical causes, and the order of events, necessary to uphold the purely embolic theory, was reversed.

I hold, then, that those who deny the possibility of spontaneous coagulation in the heart and pulmonary arteries, do so on insufficient ground, and that we may consider it to be an occurrence, rare no doubt, but still sufficiently often met with, and certainly of sufficient importance, to merit very careful study.

History.—Dr. Charles D. Meigs, of Philadelphia, was one of the first to direct attention to spontaneous coagulation of the blood in the right side of the heart and pulmonary arteries, as a cause of sudden death in the puerperal state. The occurrence itself, however, has been carefully studied by Paget, whose paper was published in 1855, four years before Meigs wrote on the subject.¹ It is true that none of Paget's cases happened after delivery, but he none the less clearly apprehended the nature of the obstruction. In 1855, Hecker² attributed the majority of these cases to embolism proper; and since that date most authors have taken the same view, believing that spontaneous coagulation only occurs in exceptional cases, such as those in which, on account of some obstruction in the lung or in the debility of the last few hours before death, coagula form in the smaller ramifications of the pulmonary arteries, and gradually creep backwards towards the heart.

Symptoms of Pulmonary Obstruction.—The symptoms can hardly be mistaken, and there seems to be no essential difference between the symptomatology of spontaneous and embolic obstructions, so that the same description will suffice for both. In a large proportion of cases the attack comes on with an appalling suddenness, which forms one of its most striking characteristics. Nothing in the condition of the patient need have given rise to the least suspicion of impending mischief, when, all at once, an intense and horrible dyspnoea comes on; she gasps and struggles for breath; tears off the coverings from her chest in a vain endeavor to get more air; and, often, dies in a few minutes, long before medical aid can be had, with all the symptoms of asphyxia. The muscles of the face and thorax are violently agitated in the attempt to oxygenate the blood, and an appearance closely resembling an epileptic convulsion may be presented. The face may be either pale or deeply cyanosed. Thus in one case I have elsewhere recorded, which was an undoubted example of true embolism, Mr. Pedler, the resident accoucheur at King's College Hospital, who was present during the attack, writes of the patient,³ "She was suffering from extreme dyspnoea, the countenance was excessively pale, her lips white, the face generally expressing deep anxiety." In another, which was probably an example of spontaneous thrombosis,⁴ occurring on the twelfth day after delivery, it is stated "the face had assumed a livid, purple hue, which was so remarkable as to attract the attention both of the nurse and of her mother, who was with her." The extreme embarrassment of the circulation is shown by the tumultuous and irregular action of the heart, in its endeavor to send the venous blood through the obstructed arteries. Soon it gets exhausted, as shown by its feeble and fluttering beat. The pulse is thread-like, and nearly imperceptible, the respirations short and hurried, but air may be heard entering the lungs freely. The intelligence during the struggle is unimpaired; and the dreadful consciousness of impending death adds not a little to the patient's sufferings, and to the terror of the scene. Such is an imperfect account of the symptoms, gathered from a record of what has been observed in fatal cases. It will be readily understood why, in the presence of so sudden and awful an attack, symptoms have not been recorded with the accuracy of ordinary clinical observation.

A question of great practical interest, which has been entirely overlooked by writers on the subject is—Have we any ground for supposing that there is a possibility of recovery after symptoms of pulmonary obstruction have developed themselves? That such a result must be of extreme rarity is beyond question; but I have little doubt that in some few cases, entirely inexplicable on any other hypothesis, life is prolonged

¹ Medico-Chir. Trans., vol. xxvii., p. 162 and vol. xxviii., p. 352; Philadelphia Medical Examiner, 1849.

² Deutsche Klinicke, 1855.

³ Brit. Med. Journ., March 27, 1869.

⁴ Obst. Trans., vol. xii., p. 194.

until the coagulum is absorbed, and the pulmonary circulation restored. In order to admit of this it is, of course, essential that the obstruction be not sufficient to prevent the passage of a certain quantity of blood to the lungs, to carry on the vital functions. The history of many cases tends to show that the obstructing clot was present for a considerable time before death, and that it was only when some sudden exertion was made, such as rising from bed or the like, calling for an increased supply of blood which could not pass through the occluded arteries, that fatal symptoms manifested themselves. This was long ago pointed out by Paget,¹ who says, "The case proves that, in certain circumstances, a great part of the pulmonary circulation may be arrested in the course of a week (or a few days more or less), without immediate danger to life, or any indication of what had happened." And, after referring to some illustrative cases, "Yet in all these cases the characters of the clots by which the pulmonary arteries were obstructed, showed plainly that they had been a week or more in the process of formation." If we admit the possibility of the continuance of life for a certain time, we must, I think, also admit the possibility, in a few rare cases, of eventual complete recovery. What is required is time for the absorption of the clot. In the peripheral venous system coagula are constantly removed by absorption. So strong, indeed, is the tendency to this, that Humphrey observes with regard to it, "It appears that the blood is almost sure to revert to its natural channel in process of time."² If, then, the obstruction be only partial, if sufficient blood pass to keep the patient alive, and a sudden supply of oxygenated blood is not demanded by any exertion which the embarrassed circulation is unable to meet, it is not inconceivable that the patient may live until the obstruction is removed.

Illustrative Cases.—Such, I believe, to be the only explanation of certain cases, some of which, on any other hypothesis, it is impossible to understand. The symptoms are precisely those of pulmonary obstruction, and the description I have given above may be applied to them in every particular; and after repeated paroxysms, each of which seems to threaten immediate dissolution, an eventual recovery takes place. What, then, I am entitled to ask, can the condition be, if not that which I suggest? As the question I am considering has never, so far as I am aware, been treated of by any other writer, I may be permitted to state, very briefly, the facts of one or two of the cases on which I found my argument, some of which I have already published in detail elsewhere.

K. H., delicate young lady. Labor easy. First child. Profuse post-partum hæmorrhage. Did well until the 7th day, during the whole of which she felt weak. Same day an alarming attack of dyspnœa came on. For several days she remained in a very critical condition, the slightest exertion bringing on the attacks. A slight blowing murmur heard for a few days at the base of the heart, and then disappeared. For two months patient remained in the same state. As long as she was in the recumbent position she felt pretty comfortable, but any attempt at sitting up in bed, or any unusual exertion immediately brought on the embarrassed respiration. During all this time it was found necessary to administer stimulants profusely to ward off the attacks. Eventually the patient recovered completely.

Q. F., æt. 44. Mother of twelve children. Confined on July 6. On the 11th day she went to bed feeling well. There was no swelling or discomfort of any kind about the lower extremities at this time. About half-past 3 A.M. she was sitting up in bed, when she was suddenly attacked with an indescribable sense of oppression in the chest, and fell back in a semi-unconscious state, gasping for breath. She remained in a very critical condition, with the same symptoms of embarrassed respiration, for three days, when they gradually passed away. Two days *after* the attack, phlegmasia dolens came on, the leg swelled, and remained so for several months.

This case is an example of the fact I have already referred to, of phlegmasia dolens coming on *after* the symptoms of pulmonary obstruction had manifested themselves; the inference being that both depended on similar causes operating on two distinct parts of the circulatory system.

C. H., æt. 24. Confined of her first child on August 20, 1867. Thirty hours after delivery she complained of great weakness and dyspnœa. This was alleviated by the treatment employed, but on the ninth day, after making a sudden exertion, the dyspnœa returned with increased violence, and continued unabated until I saw the patient on September 4, fourteen days after her confinement. The following are the notes of her condition made at the time of the visit: "I found her sitting on the sofa, propped up with pillows, as she said she could not breathe in the recumbent position. The least excitement or talking brought on the most aggravated dyspnœa, which was so bad as to threaten almost instant death. Her sufferings during these paroxysms were terrible to witness. She panted and struggled for breath, and her chest heaved with short gasping respirations. She could not even bear any one to stand in front of her, waving them away with her hand, and calling for more air. These attacks were very frequent and were brought on by the most trivial causes. She talked in a low, suppressed voice, as if she could not

¹ Op. cit., p. 358.

² Med. Chir. Trans., vol. xxvii., p. 14.

spare breath for articulation. On auscultation air was found to enter the lungs freely in every direction, both in front and behind. Immediately over the site of the pulmonary arteries there was a distinct harsh, rasping murmur, confined to a very limited space, and not propagated either upwards or downwards. The heart-sounds were feeble and tumultuous." These symptoms led me to diagnose pulmonary obstruction, and I, of course, gave a most unfavorable prognosis, but to my great surprise the patient slowly recovered. I saw her again six weeks later, when her heart-sounds were regular and distinct, and the murmur had completely disappeared.

E. E., æt. 42, was confined for the first time on November 5, 1873, in the sixth month of utero-gestation. She had severe post-partum hæmorrhage, depending on partially adherent placenta, which was removed artificially. She did perfectly well until the 14th day after delivery, when she was suddenly attacked with intense dyspnoea, aggravated in paroxysms. Pulse pretty full, 130, but distinctly intermittent. Air entered lungs freely. The heart's action was fluttering and irregular, and, at the juncture of the fourth and fifth ribs with the sternum there was a loud blowing systolic murmur. This was certainly non-existent before, as the heart had been carefully auscultated before administering chloroform during labor. For two days the patient remained in the same state, her death being almost momentarily expected. On the 21st, that is two days after the appearance of the chest symptoms, phlegmasia dolens of a severe kind developed itself in the right thigh and leg. She continued in the same state for many days, lying more or less tranquilly, but having paroxysms of the most intense apnoea, varying from two to six or eight in the twenty-four hours. No one who saw her in one of these could have expected her to live through it. Shortly after the first appearance of the paroxysms it was observed that the cellular tissue of the neck and part of the face became swollen and œdematous, giving an appearance not unlike that of phlegmasia dolens. The attacks were always relieved by stimulants. These she incessantly called for, declaring that she felt they kept her alive. During all this time the mind was clear and collected. The pulse varied from 110 to 130. Respirations about 60, temperature, 101° to 102.5°. By slow degrees the patient seemed to be rallying. The paroxysms diminished in number, and after December 1, she never had another, and the breathing became free and easy. The pulse fell to 80, and the cardiac murmur entirely disappeared. The patient remained, however, very weak and feeble, and the debility seemed to increase. Towards the second week in December she became delirious and died, apparently exhausted, without any fresh chest symptoms, on the 19th of that month. No post-mortem examination was allowed.

I have narrated this case, although it terminated fatally, because I hold it to be one of the class I am considering. The death was certainly not due to the obstruction, all symptoms of which had disappeared, but apparently to exhaustion from the severity of the former illness. It illustrates, too, the simultaneous appearance of symptoms of pulmonary obstruction and peripheral thrombosis. The swelling of the neck was a curious symptom, which has not been recorded in any other cases, and may possibly be a further proof of the analogy between this condition and phlegmasia dolens.

Now, it may, of course, be argued that these cases do not prove my thesis, inasmuch as I only assume the presence of a coagulum. But I may fairly ask in return what other condition could possibly explain the symptoms? They are precisely those which are noticed in death from undoubted pulmonary obstruction. No one seeing one of them, or even reading an account of the symptoms, while ignorant of the result, could hesitate a single instant in the diagnosis. Surely, then, the inference is fair that they depended on the same cause? In the very nature of things my hypothesis cannot be verified by post-mortem examination; but there is at least one case on record in which, after similar symptoms, a clot was actually found. The case is related by Dr. Richardson.¹ It was that of a man who for weeks had symptoms precisely similar to those observed in the cases I have narrated. In one of his agonizing struggles for breath he died, and after death it was found "that a fibrinous band, having its hold in the ventricle, extended into the pulmonary artery." This observation proves to a certainty that life may continue for weeks after the deposition of a coagulum; and, moreover, this condition was precisely what we should anticipate, since, of course, the obstructing coagulum must necessarily be small, otherwise the vital functions would be immediately arrested.

Cardiac Murmurs in Pulmonary Obstruction.—There is a symptom noted in two of the above cases, and to less extent in a third, which has not been mentioned in any account of fatal cases occurring after delivery, viz., a murmur over the site of the pulmonary arteries. It is a sign we should naturally expect, and very possibly it would be met with in fatal cases if attention were particularly directed to the point. In both these instances it was exceedingly well marked, and in both it entirely disappeared when the symptoms abated. The probability of such a murmur being audible in cases of thrombosis of the pulmonary artery, has been recognized by one of our highest authorities in cardiac disease, who actually observed it in a non-puerperal case. In the last edition of his work on diseases of the heart, Dr. Walshe² says: "The only physical condition connected with the vessel itself would probably be systolic basic murmur

¹ Clinical Essays, p. 224 et seq.

² Walshe, On Diseases of the Heart, 4th ed., 1873.

following the course of the pulmonary main trunk and of its immediate divisions to the left and right of the sternum. This sign I most certainly heard in an old gentleman whose life was brought to a sudden close, in the course of an acute affection, by coagulation in the pulmonary artery, and to a moderate extent in the right ventricle."

Similar cases have, probably, been overlooked or misinterpreted. Many seem to have been attributed to shock, in the absence of a better explanation, a condition to which they bear no kind of resemblance.

Causes of Death.—The precise mode of death in pulmonary obstruction, whether dependent on thrombosis or embolism, has given rise to considerable difference of opinion. Virchow attributes it to syncope,¹ depending on stoppage of the cardiac contraction. Panum,² on the other hand, contests this view, maintaining that the heart continues to beat even after all signs of life have ceased. Certainly tumultuous and irregular pulsations of the heart are prominent symptoms in most of the recorded cases, and are not reconcilable with the idea of syncope. Panum's own theory is, that death is the result of cerebral anæmia. Paget seems to think that the mode of death is altogether peculiar, in some respects resembling syncope, in others anæmia. Bertin, who has discussed the subject at great length, attributes the fatal result purely to asphyxia. The condition, indeed, is in all respects similar to that state; the oxygenation of the blood being prevented, not because air cannot get to the blood, but because blood cannot get to the air. The symptoms also seem best explained by this theory; the intense dyspnoea, the terrible struggle for air, the preservation of intelligence, the tumultuous action of the heart, are certainly not characteristic either of syncope or anæmia.

Post-mortem Appearances of Clots.—The anatomical character of the clots seems to vary considerably. Ball, by whom they have been most carefully described, believes that they generally commence in the smaller ramifications of the arteries, extending backwards towards the heart, and filling the vessels more or less completely. Towards its cardiac extremity the coagulum terminates in a rounded head, in which respect it resembles those spontaneously formed in the peripheral veins. It is non-adherent to the coats of the vessels, and the blood circulates, when it can do so at all, between it and the vascular walls. Such clots are white, dense, and of a homogeneous structure, consisting of layers of decolorized fibrine, firm at the periphery, where the fibrine has been most recently deposited, and softened in the centre, where amylaceous or fatty degeneration has commenced. Ball maintains that if the coagulum have commenced in the larger branches of the arteries, it must have first begun in the ventricle, and extended into them. According to Humphrey, the same changes take place in pulmonary as in peripheral thrombi, and they may become adherent to the walls of the vessels, or converted into threads or bands. When the obstruction is due to embolism, provided the case is a well-marked one, and the embolus of some size, the appearances presented are different. We have no longer a laminated and decolorized coagulum, with a rounded head, similar to a peripheral thrombus. The obstruction in this case generally takes place at the point of bifurcation of the artery, and we there meet with a grayish-white mass, contrasting remarkably with the more recently deposited fibrine before and behind it. It may be that the form of the embolus shows that it has recently been separated from a clot elsewhere; and in many cases it has been possible to fit the travelled portion to the extremity of the clot from which it has been broken.

We may also, perhaps, find that the embolus has undergone an amount of retrograde metamorphosis corresponding with that of the peripheral thrombus from which we suppose it to have come, but differing from that of the more recently deposited fibrine around it. It must be admitted, however, that the anatomical peculiarities of the coagula will by no means always enable us to trace them to their true origin. In many cases emboli may escape detection from their smallness, or from the quantity of fibrine surrounding them.

Treatment.—But few words need be said as to the treatment of pulmonary obstruction. In a large majority of cases the fatal result so rapidly follows the appearance of the symptoms, that no time is given us even to make an attempt to alleviate the patient's sufferings. Should we meet with a case not immediately fatal, it seems that there are but two indications of treatment affording the slightest rational ground of hope.

1. To keep the patient alive by the administration of stimulants—brandy, ether, ammonia, and the like—to be repeated at intervals corresponding to the intensity of the paroxysms, and the results produced. In the cases I have above narrated, in which recovery ensued, this took the place of all other medication. Possibly leeches, or dry cupping to the chest, might prove of some service in relieving the circulation.

¹ Gesamm. Abhandl., 1862, p. 316.

² Virchow's Archiv, 1863.

2. To enjoin the most absolute and complete repose. The object of this is evident. The only chance for the patient seems to be, that the vital functions should be carried on until the coagulum has been absorbed, or, at least, until it has been so much lessened in size as to admit of blood passing it to the lungs. The slightest movements may give rise to a fatal paroxysm of dyspnoea, from the increased supply of oxygenated blood required. It must not be forgotten that in a large proportion of cases death immediately followed some exertion in itself trivial, such as rising out of bed. Too much attention, then, cannot be given to this point. The patient should be absolutely still; she should be fed with abundance of fluid food, such as milk, strong soups, and the like; and should on no account be permitted to raise herself in bed, or attempt the slightest muscular exertion. If we are fortunate enough to meet with a case apparently tending to recovery, these precautions must be carried on long after the severity of the symptoms has lessened, for a moment's imprudence may suffice to bring them back in all their original intensity.

Bertin,¹ indeed, recommends a system of treatment very different from this. In the vain hope that the violent effort induced may cause the displacement of the impacted embolus (to which alone he attributes pulmonary obstruction), he recommends the administration of emetics. Few, I fancy, will be found bold enough to attempt so hazardous a plan of treatment.

Various drugs have been suggested in these cases. Richardson recommended ammonia, a deficiency of which he at that time believed to be the chief cause of coagulation. He has since advised that liquor ammoniæ should be given in large doses, 20 minims every hour, in the hope of causing solution of the deposited fibrine; and he has stated that he has seen good results from the practice. Others advise the administration of alkalis, in the hope that they may favor absorption. The best that can be said for them is, that they are not likely to do much harm.

CHAPTER VII.

PUERPERAL ARTERIAL THROMBOSIS AND EMBOLISM.

THE same condition of the blood which so strongly predisposes to coagulation in the vessels through which venous blood circulates, tends to similar results in the arterial system. These, however, are by no means so common, and do not, as a rule, lead to such important consequences. The subject has been but little studied, and almost all our knowledge of it is derived from a very interesting essay by Sir James Simpson.² As I have devoted so much space to the consideration of venous thrombosis and embolism, I shall but briefly consider the effects of arterial obstruction.

Causes.—In a considerable number of recorded cases the obstruction has resulted from the detachment of vegetations deposited on the cardiac valves, the result of endocarditis, either produced by antecedent rheumatism or as a complication of the puerperal state. Sometimes the obstruction seems to depend on some general blood dyscrasia, similar to that producing venous thrombosis, or on some local change in the artery itself. Thus, Simpson records a case apparently produced by local arteritis, which caused acute gangrene of both lower extremities, ending fatally in the third week after delivery. In other cases it has been attributed to coagulation following spontaneous laceration and corrugation of the internal coat of the artery.

Symptoms.—The symptoms of puerperal arterial obstruction must, of course, vary with the particular arteries affected. Those with the obstruction of which we are most familiar are the cerebral, the humeral, and the femoral. The effects produced must also be modified by the size of the embolus, and the more or less complete obstruction it produces. Thus, for example, if the middle cerebral artery be blocked up entirely, the functions of those portions of the brain supplied by it will be more or less completely arrested, and hemiplegia of the opposite side of the body, followed by softening of the brain-texture, will probably result. If the nervous symptoms be developed gradually, or increase in intensity after their first appearance, it may be that an obstruct-

¹ Op. cit., p. 393.

² Selected Obst. Works, vol. i., p. 523.

tion, at first incomplete, has increased by the deposition of fibrine around it. So the occasional sudden supervention of blindness, with destruction of the eyeball—cases of which are recorded by Simpson—not improbably depend on occlusion of the ophthalmic artery, the function of the organ depending on its supply through the single artery. The effects of obstruction of the visceral arteries in the puerperal state are entirely unknown; but it is far from unlikely that further investigation may prove them to be of great importance. In the extremities arterial obstruction produces effects which are well marked. They are classified by Simpson under the following heads: 1. *Arrest of pulse below the site of obstruction.*—This has been observed to come on either suddenly or gradually, and if the occlusion be in one of the large arterial trunks, it is a symptom which a careful examination will readily enable us to detect. 2. *Increased force of pulsation in the arteries above the seat of obstruction.* 3. *Fall in the temperature of the limb.*—This is a symptom which is easily appreciable by the thermometer, and, when the main artery of the limb is occluded, the coldness of the extremity is well marked. 4. *Lesions of motor and sensory functions, paralysis, neuralgia, etc., etc.*—Loss of power in the affected limb is often a prominent symptom, and when it comes on suddenly, and is complete, the main artery will probably be occluded. It may be diagnosed from paralysis depending on cerebral or spinal causes by the absence of head symptoms, by the history of the attack, and by the presence of other indications of arterial obstruction, such as loss of pulsation in the artery, fall of temperature, etc. The sensory functions in these cases are generally also seriously disturbed, not so much by loss of sensation as by severe pain and neuralgia. Sometimes the pain has been excessive, and occasionally it has been the first symptom which directed attention to the state of the limb. 5. *Gangrene below or beyond the seat of arterial obstruction.*—Several interesting cases are recorded, in which gangrene has followed arterial obstruction. Generally speaking, gangrene will not follow occlusion of the main arterial trunk of an extremity, as the collateral circulation becomes soon sufficiently developed to maintain its vitality. In many of the cases, either thrombi have obstructed the channels of collateral circulation as well, or the veins of the limb have also been blocked up. When such extensive obstructions occur they obviously cannot be embolic, but must depend on a local thrombosis, traceable to some general blood dyscrasia depending on the puerperal state. *Treatment.*—Little can be said as to the treatment of such cases, which must vary with the gravity and nature of the symptoms in each. Beyond absolute rest (in the hope of eventual absorption of the thrombus or embolus), generous diet, attention to the general health of the patient, and sedative applications to relieve the local pain, there is little in our power. Should gangrene of an extremity supervene in a puerperal patient, the case must necessarily be wellnigh hopeless. Simpson, however, records one instance in which amputation was performed above the line of demarcation, the patient eventually recovering.

CHAPTER VIII.

OTHER CAUSES OF SUDDEN DEATH DURING LABOR AND THE PUERPERAL STATE.

A LARGE number of the cases in which sudden death occurs during or after delivery find their explanation, as I have already pointed out, in thrombosis or embolism of the heart and pulmonary arteries. Probably many cases of the so-called *idiopathic asphyxia* were, in fact, examples of this accident, the true nature of which had been misunderstood. Besides these, there are, no doubt, many other conditions which may lead to a sudden fatal result in connection with parturition.

Some of these are of an organic, others of a functional nature.

Organic Causes.—Among the former may be mentioned cases in which the straining efforts of the second stage of labor have produced death in patients suffering from some pre-existent disease of the heart. Rupture of that organ has probably occurred from fatty degeneration of its walls. Dehous¹ narrates an instance in which the efforts of labor caused the rupture of an aneurism. Another case, from interference with the

¹ Dehous, Sur les Morts subites.

action of the heart in a patient who had pericardial effusion, is narrated by Ramsbotham. Dr. Devilliers relates an instance occurring in a young woman during the second stage of labor. The heart was found to be healthy, but the lungs were intensely congested, and blood was extensively extravasated all through their texture. This was probably caused by pulmonary congestion and apoplexy, produced by the severe straining efforts. Many cases from effusion of blood into the brain-substance, or on its surface, are on record, no doubt in patients who, from arterial degeneration or other causes, were predisposed to apoplectic effusions. The so-called apoplectic convulsions, formerly described in most works on obstetrics as a variety of puerperal convulsions, are evidently nothing more than apoplexy coming on during or after labor. As regards their pathology they do not seem to differ from ordinary cases of apoplexy in the non-pregnant condition. One example is recorded of death which was attributed to rupture of the diaphragm from excessive action in the second stage.

Functional Causes.—Among the causes of death which cannot be traced to some distinct organic lesion, may be classed cases of syncope, shock, and exhaustion. Many instances of this kind are recorded. Thus in some women of susceptible nervous organization, the severity of the suffering appears to bring on a condition similar to that produced by excessive shock or exhaustion, which has not unfrequently proved fatal. Several examples of this kind have been cited by McClintock.¹ It is also not unlikely that sudden syncope sometimes produces a fatal result, during or after labor. Most cases of death, otherwise inexplicable, used to be referred to this cause; but accurate autopsies were seldom made, and even when they were—the important effects of pulmonary coagula being unknown—it is more than probable that the true cause of death was overlooked. It has been supposed that the sudden removal of pressure from the veins of the abdomen, by the emptying of the gravid uterus after delivery, may favor an increased afflux of blood into the lower parts of the body, and thus tend to an anæmic condition of the brain, and the production of syncope. However this may be, the possibility of its occurrence, and its manifest danger in a recently delivered woman, are sufficient reasons for enforcing the recumbent position after labor is over. In some of the cases the syncope was evidently produced by the patient's suddenly sitting upright.

Death from Air in the Veins.—Some cases of sudden death immediately after labor seem to be due to the entrance of air into the veins. Six examples are cited by McClintock which were probably due to this cause. La Chapelle relates two. An interesting case is related by M. Lionet.² In this the patient died five and a half hours after an easy and natural labor, the chief symptoms being extreme pallor, efforts at vomiting, and dyspnoea. Air was found in the heart and in the arachnoid veins. There can be no question that the uterine sinuses after delivery are nearly as well adapted as the veins of the neck for allowing the entrance of air. They are firmly attached to the muscular walls of the uterus, so that they gape open when that organ is relaxed, and it is easy to understand how air might enter. Indeed, in the post-mortem examination in one of the cases occurring in the practice of Mme. La Chapelle, it is stated that "the uterine sinuses opened in the interior of the uterus by large orifices (one line and a half in diameter), through which air could readily be blown as far as the iliac veins, and *vice versa*." The condition of the uterus after delivery also enables the air to have ready access to the mouths of the sinuses, for the alternate relaxation and contraction of the uterus, occurring after the placenta is expelled, would tend to draw in the air as by a suction pump. Hence, an additional reason for insisting on firm contraction of the uterus, as this will lessen the risk of this accident.

Cause of Death in such Cases.—The precise mechanism of death from air in the veins, has been a subject of dispute among pathologists. By Bichat,³ it was referred to anæmia and syncope from want of blood in the vessels of the brain, which are occupied by air; Nysten⁴ attributed it to distention of the cavities of the heart by rarefied air, producing paralysis of its wall; Leroy to a stoppage of the pulmonary circulation, and consequent want of proper blood-supply to the left heart; while Leroy d'Etoilles thought it might depend on any of these causes, or a combination of all of them. These, and many other hypotheses on the subject, have been advanced, to all of which serious objection could be raised. The most recent theory is one maintained by Virchow and Oppolzer,⁵ and more recently by Feliz, which attributes the fatal results to impaction of the air-globules in the lesser divisions of the pulmonary arteries, where

¹ Union Medic., 1853.

³ Recherches sur la Vie et la Mort, 1853.

⁴ Nysten, Recherches de Phys. et Chem. Path., 1811.

⁵ Casuistics des Embolie; Wiener Med. Woch., 1863. Des Embolies Capillaires, 1868. Op. cit.

they form gaseous emboli, and cause death exactly in the same way as when the obstruction depends on a fibrinous embolus. The symptoms observed in fatal cases closely correspond to those of pulmonary obstruction, and it is not unlikely that some cases, attributed to other causes, may really depend on the entrance of air through the uterine sinuses. Such, for example, was most probably the explanation of a case referred to by Dr. Graily Hewitt in a discussion at the Obstetrical Society.¹ Death occurred shortly after the removal of an adherent placenta, during which, no doubt, air could readily enter the uterine cavity. The symptoms, viz., "severe pain in the cardiac region, distress as regards respiration, and pulselessness," are identical with those of pulmonary obstruction. Dr. Hewitt refers the death to shock, which certainly does not generally produce such phenomena.

CHAPTER IX.

PERIPHERAL VENOUS THROMBOSIS—(SYN.: CRURAL PHELEBITIS—PHLEGMASIA DOLENS—ANASARCA SEROSA—ŒDEMA LACTEUM—WHITE LEG, ETC.).

WE now come to discuss the symptoms and pathology of the conditions associated with the formation of thrombi in the peripheral venous system, or rather in the veins of the lower extremities, since too little is known of their occurrence in other parts to enable us to say anything on the subject.

The most important of these is the well-known disease which, under the name of *phlegmasia dolens*, has attracted much attention, and given rise to numerous theories as to its nature and pathology. In describing it as a local manifestation of a general blood-dyscrasia, and not as an essential local disease, I am making an assumption as to its pathology that many eminent authorities would not consider justifiable. I have, however, already stated some of the reasons for so doing, and I shall shortly hope to show that this view is not incompatible with the most probable explanation of the peculiar state of the affected limb.

Symptoms.—The first symptom which usually attracts attention is severe pain in some part of the limb that is about to be affected. The character of the pain varies in different cases. In some it is extremely acute, and is most felt in the neighborhood of and along the course of the chief venous trunks. It may begin in the groin or hip and extend downwards, or it may commence in the calf and proceed upwards towards the pelvis. The pain abates somewhat after swelling of the limb (which generally begins within twenty-four hours), but it is always a distressing symptom, and continues as long as the acute stage of the disease lasts. The restlessness, want of sleep, and suffering which it produces are sometimes excessive. Coincident with the pain, and sometimes preceding it, more or less malaise is experienced. The patient may for a day or two be restless, irritable, and out of sorts, without any very definite cause; or the disease may be ushered in by a distinct rigor. Generally there is constitutional disturbance, varying with the intensity of the case. The pulse is rapid and weak, 120 or thereabouts; the temperature elevated from 101° to 102°, with an evening exacerbation. The patient is thirsty; the tongue glazed, or white and loaded; the bowels constipated. In some few cases, when the local affection is slight, none of these constitutional symptoms are observed.

Condition of the Affected Limb.—The characteristic swelling rapidly follows the commencement of the symptoms. It generally begins in the groin, from whence it extends downwards. It may be limited to the thigh, or the whole limb, even to the feet, may be implicated. More rarely it commences in the calf of the leg, extending upwards to the thigh and downwards to the feet. The affected parts have a peculiar appearance, which is pathognomonic of the disease. They are hard, tense, and brawny, of a shiny, white color, and not yielding on pressure, except towards the beginning and end of the illness. The appearances presented are quite different from those of ordinary œdema. When the whole thigh is affected, the limb is enormously increased in size. Frequently the venous trunks, especially the femoral and popliteal veins, are felt obstructed with coagula, and rolling under the finger. They are painful when handled, and in their

¹ Obstet. Trans., vol. x., p. 28.

course more or less redness is occasionally observed. Either leg may be attacked, but the left more frequently than the right. There is a marked tendency for the disease to spread, and we often find, in a case which is progressing apparently well, a rise of temperature and an accession of febrile symptoms, followed by the swelling of the other limb.

Progress of the Disease.—After the acute stage has lasted from a week to a fortnight, the constitutional disturbance becomes less marked, the pulse and temperature fall, the pain abates, and the sleeplessness and restlessness are less. The swelling and tension of the limb now begin to diminish, and absorption commences. This is invariably a slow process. It is always many weeks before the effusion has disappeared, and it may be many months. The limb retains for a length of time the peculiar *wooden* feeling, as Dr. Churchill terms it. Any imprudence, such as a too early attempt at walking, may bring on a relapse and fresh swelling of the limb. This gradual recovery is by far the most common termination of the disease. In some rare cases, suppuration may take place either in the subcutaneous cellular tissue, the lymphatic glands, or even in the joints, and death may result from exhaustion. The possibility of pulmonary obstruction and sudden death from separation of an embolus have already been pointed out, and the fact that this lamentable occurrence has generally followed some undue exertion should be borne in mind, as a guide in the management of our patient.

Period of Commencement.—The disease usually begins within a short time after delivery, rarely after the second week. In 22 cases tabulated by Dr. Robert Lee, 7 were attacked between the fourth and twelfth days, and 14 after the second week. Some cases have been described as commencing even months after delivery. It is questionable if these can be classed as puerperal, for it must not be forgotten that phlegmasia dolens is by no means necessarily a puerperal disease. There are many other conditions which may give rise to it, all of them, however, such as produce a septic and hyperinosed state of the blood, such as malignant disease, dysentery, phthisis, and the like. My own experience would lead me to think that cases of this kind are much more common than is generally believed.

History and Pathology.—The disease has long attracted the attention of the profession. Passing over more or less obscure notices by Hippocrates, De Castro, and others, we find the first clear account in the writings of Mauriceau, who not only gave a very accurate description of its symptoms, but made a guess at its pathology, which was certainly more happy than the speculations of his successors; it is, he says, caused "by a reflux on the parts of certain humors which ought to have been evacuated by the lochia." Puzos ascribed it to the arrest of the secretion of milk, and its extravasation in the affected limb. This theory, adopted by Levret and many subsequent writers, took a strong hold on both professional and public opinion, and to it we owe many of the names by which the disease is known to this day, such as œdema, lacteum, milk leg, etc. In 1784, Mr. White, of Manchester, attributed it to some morbid condition of the lymphatic glands and vessels of the affected parts; and this, or some analogous theory, such as that of rupture of the lymphatics crossing the pelvic brim, as maintained by Tyre, of Gloucester, or general inflammation of the absorbents, as held by Dr. Ferriar, was generally adopted.

Phlebitic Theory.—It was not until the year 1823 that attention was drawn to the condition of the veins. To Bouillaud belongs the undoubted merit of first pointing out that the veins of the affected limb were blocked up by coagula, although the fact had been previously observed by Dr. Davis, of University College. Dr. Davis made dissection of the veins in a fatal case, and found, as Bouillaud had done, that they were filled with coagula, which he assumed to be the results of inflammation of their coats; hence the name of "*crural phlebitis*," which has been extensively adopted instead of phlegmasia dolens. Dr. Robert Lee did much to favor this view, and finding that thrombi were present in the iliac and uterine, as well as in the femoral, veins, he concluded that the phlebitis commenced in the uterine branches of the hypogastric veins, and extended downwards to the femorals. He pointed out that phlegmasia dolens was not limited to the puerperal state; but that when it did occur independently of it, other causes of uterine phlebitis were present, such as cancer of the os and cervix uteri. The inflammatory theory was pretty generally received, and even now is considered by many to be a sufficient explanation of the disease. Indeed, the fact that more or less thrombus was always present could not be denied, and on the supposition that thrombus could only be caused by phlebitis, as was long supposed to be the case, the inflammatory theory was the natural one. Before long, however, pathologists pointed out that thrombosis was by no means necessarily, or even generally, the result of inflammation of the vessels in which the clot was contained, but that the inflammation was more generally the result of the coagulum.

Theory of its Dependence on Septic Causes.—The late Dr. Mackenzie took a prominent part in opposing the phlebotic theory. He proved by numerous experiments in the lower animals, that inflammation is not sufficient of itself to produce the extensive thrombi which are found to exist, and that inflammation originating in one part of a vein is not apt to spread along its canal, as the phlebotic theory assumes. His conclusion is, that the origin of the disease is rather to be sought in some septic or altered condition of the blood, producing coagulation in the veins. Dr. Tyler Smith¹ pointed out an occasional analogy between the causes of phlegmasia dolens and puerperal fever, evidently recognizing the dependence of the former on blood dyscrasia. "I believe," he says, "that contagion and infection play a very important part in the production of the disease. I look on a woman attacked with phlegmasia dolens as having made a fortunate escape from the greater dangers of diffuse phlebitis or puerperal fever." In illustration of this he narrates the following instructive history: "A short time ago a friend of mine had been in close attendance on a patient dying of erysipelatous sore-throat with sloughing, and was himself affected with sore-throat. Under these circumstances, he attended, within the space of twenty-four hours, three ladies in their confinements, all of whom were attacked with phlegmasia dolens."

View of Tilbury Fox.—The latest important contribution to the pathology of the disease is contained in two papers by Dr. Tilbury Fox, published in the second volume of the *Obstetrical Transactions*. He maintains that something beyond the mere presence of coagula in the veins is required to produce the phenomena of the disease, although he admits that to be an important, and even an essential, part of pathological changes present. The thrombi he believes to be produced either by extrinsic or intrinsic causes: the former comprising all cases of pressure by tumor or the like; the latter, and the most important, being divisible into the heads of—

1. True inflammatory changes in the vessels, as seen in the epidemic form of the disease.

2. Simple thrombus, produced by rapid absorption of morbid fluid.

3. Virus action and thrombus conjoined, the phlegmasia dolens itself being the result of simple thrombus, and not produced by diseased (inflamed) coats of vessels; the general symptoms the result of the general blood state; the virus present.

He further points out that the peculiar swelling of the limbs cannot be explained by the mere presence of œdema, from which it is essentially different. The white appearance of the skin, the severe neuralgic pain, and the persistent numbness indicating that the whole of the cutaneous textures, the cutis vera and even the epithelial layer, are infiltrated with fibrinous deposit. He concludes, therefore, that the swelling is the result of œdema *plus* something else; that something being obstruction of the lymphatics, by which the absorption of effused serum is prevented. The efficient cause which produces these changes he believes to be, in the majority of cases, a septic action originating in the uterus, producing a condition similar to that in which phlegmasia dolens arises in the non-puerperal state.

There is no doubt much force in Dr. Fox's arguments, and it may, I think, be conceded that obstruction of the veins *per se* is not sufficient to produce the peculiar appearance of the limb. It is, moreover, certain that phlebitis alone is also an insufficient explanation, not only of the symptoms, but even of the presence of thrombi so extensive as those that are found. The view which traces the disease solely to inflammation or obstruction of lymphatics, is purely theoretical, has no basis of facts to support it, and finds, nowadays, no supporters. The experiments of Mackenzie and Lee, as well as the vastly increased knowledge of the causes of thrombosis, which the researches of modern pathologists have given us, seem to point strongly to the view already stated, that the disease can only be explained by a general blood dyscrasia, depending on the puerperal state. It by no means follows that we are to consider Dr. Fox's speculations as incorrect. It is far from improbable that the lymphatic vessels are implicated in the production of the peculiar swelling, only we are not, as yet, in a position to prove it. There is no inherent improbability in the supposition that the same morbid state of the blood which produces thrombosis in the veins, may also give rise to such an amount of irritation in the lymphatics as may interfere with their functions, and even obstruct them altogether. The essential and all-important point in the pathology of the disease, however, seems undoubtedly to be thrombosis in the veins; and the probability of there being some as yet undetermined pathological changes in addition to this, by no means militates against the view I have taken of the intimate connection of the disease with other results of thrombosis in different vessels.

Changes Occurring in the Thrombi.—The changes which take place in the thrombi

¹ Tyler Smith, *Manual of Obstetrics*, p. 538.

all tend to their ultimate absorption. These have been described by various authors as leading to organization or suppuration. It is probable, however, that the appearances which have led to such a supposition are fallacious, and that they are really due to retrograde metamorphosis of the fibrine, generally of an amylaceous or fatty character.

Detachment of Emboli.—The peculiarities of a clot that most favor detachment of an embolus are such a shape as admits of a portion floating freely in the blood-current, by the force of which it is detached and carried to its ultimate destination. When the accident has occurred, it is often possible to recognize the peripheral thrombus from which the embolus has separated, by the fact of its terminal extremity presenting a freshly fractured end, instead of the rounded head natural to it. Such detachment is unlikely to occur, even when favored by the shape of the clot, unless sufficient time have elapsed after its formation to admit of its softening and becoming brittle. The curious fact I have before mentioned, of true puerperal embolism occurring, in the large majority of cases, only after the nineteenth day from delivery, finds a ready explanation in this theory, which it remarkably corroborates.

Treatment.—On the supposition that phlegmasia dolens was the result of inflammation of the veins of the affected limb, an antiphlogistic course of treatment was naturally adopted. Accordingly, most writers on the subject recommended depletion, generally by the application of leeches, along the course of the affected vessels. We are told that if the pain continue the leeches should be applied a second, or even a third time. If we admit the septic origin of the disease, we must, I think, see the impropriety of such a practice. The fact that it occurs, in a large majority of cases, in patients of a weakly and debilitated constitution, often in women who have already suffered from hæmorrhage, is a further reason for not adopting this routine custom. If local loss of blood be used at all, it should be strictly limited to cases in which there is much tenderness and redness along the course of the veins, and then only in patients of plethoric habit and strong constitution; cases of this kind will form a very small minority of those coming under our observation.

Over-active Treatment Unadvisable.—What has been said of the pathology of the affection tends to the conclusion that active treatment of any kind, in the hope of curing the disease, is likely to be useless. Our chief reliance must be on time and perfect rest, in order to admit of the thrombi and the secondary effusion being absorbed; while we relieve the pain and other prominent symptoms, and support the strength and improve the constitution of the patient.

Relief of Pain, etc.—The constant application of heat and moisture to the affected limb, will do much to lessen the tension and pain. Wrapping the entire limb in linseed-meal poultices, frequently changed, is one of the best means of meeting this indication. If, as is sometimes the case, the weight of the poultices be too great to be readily borne, we may substitute warm flannel stupes, covered with oiled silk. Local anodyne applications afford much relief, and may be advantageously used along with the poultices and stupes, either by sprinkling their surface freely with laudanum, or chloroform and belladonna liniment, or by soaking the flannels in poppy-head fomentation. It is needless to say that the most absolute rest in bed should be enjoined, even in slight cases, and that the limb should be effectually guarded from undue pressure by a cradle or some similar contrivance. Local counter-irritation has been strongly recommended, and frequent blisters have been considered by some to be almost specific. I should myself hesitate to use blisters, as they would certainly not be soothing applications, and one hardly sees how they can be of much service in hastening the absorption of the effusion.

Constitutional Treatment.—During the acute stage of the disease the constitutional treatment must be regulated by the condition of the patient. Light, but nutritious diet, must be administered in abundance, such as milk, beef-tea, and soups. Should there be much debility, stimulants, in moderation, may prove of service. With regard to medicines, we shall probably find benefit from such as are calculated to improve the condition of the blood and the general health of the patient. Chlorate of potash, with diluted hydrochloric acid, quinine, either alone or in combination with sesquicarbonate of ammonia, the tincture of the perchloride of iron, are the drugs that are most likely to prove of service. Alkalies and other medicines, which have been recommended in the hope of hastening the absorption of coagula, must be considered as altogether useless. Pain must be relieved and sleep produced by the judicious use of anodynes, such as Dover's powder, the subcutaneous injection of morphia, or chloral. Generally no form answers so well as the hypodermic injection of morphia.

Subsequent Local Treatment.—When the acute symptoms have abated, and the temperature has fallen, the poultices and stupes may be discontinued, and the limb

swathed in a flannel roller from the toes upwards. The equable pressure and support thus afforded materially aid the absorption of the effusion, and tend to diminish the size of the limb. At a still later stage very gentle inunctions of weak iodine ointment may be used with advantage once a day before the roller is applied. Shampooing and friction of the limb, generally recommended for the purpose of hastening absorption, should be carefully avoided, on account of the possible risk of detaching a portion of the coagulum, and producing embolism. This is no merely imaginary danger, as the following fact narrated by Trousseau proves. "A phlegmasia alba dolens had appeared on the left side in a young woman suffering from peri-uterine phlegmon. The pain having ceased, a thickened venous trunk was felt on the upper and internal part of the thigh. Rather strong pressure was being made, when M. Demarquay felt something yield under his fingers. A few minutes afterwards the patient was attacked with dreadful palpitation, tumultuous cardiac action, and extreme pallor, and death was believed to be eminent. After some hours, however, the oppression ceased, and the patient eventually recovered. A slightly attached coagulum must have become separated, and conveyed to the heart or pulmonary artery."¹ Warm douches of water, of salt water if it can be obtained, may be advantageously used in the later stages of the disease, and they may be applied night and morning, the limb being bandaged in the interval. The occasional use of the electric current is said to promote absorption, and would seem likely to be a serviceable remedy.

Change of Air, etc.—When the patient is well enough to be moved, a change of air to the sea-side will be of value. Great caution, however, should be recommended in using the limb, and it is far better not to run the risk of a relapse by any undue haste in this respect. It is well to warn the patient and her friends, that a considerable time must of necessity elapse, before the local signs of the disease have completely disappeared.

CHAPTER X.

PELVIC CELLULITIS AND PELVIC PERITONITIS.

FROM the earliest time the occurrence after parturition of severe forms of inflammatory disease in and about the pelvis, frequently ending in suppuration, has been well known. It is only of late years, however, that these diseases have been made the subject of accurate clinical and pathological investigation, and that their true nature has begun to be understood. Nor is our knowledge of them as yet by any means complete. They merit careful study on the part of the accoucheur, for they give rise to some of the most severe and protracted illnesses from which puerperal patients suffer. They are often obscure in their origin and apt to be overlooked, and they not rarely leave behind them lasting mischief.

These diseases are not limited to the puerperal state. On the contrary, many of the severest cases arise from causes altogether unconnected with child-bearing. These will not be now considered, and this chapter deals solely with such forms as may be directly traced to child-birth.

Two Distinct Forms.—Recent researches have demonstrated that there are two distinct varieties of inflammatory disease met with after labor, which differ materially from each other in many respects. In one of these, the inflammation affects chiefly the connective tissue surrounding the generative organs contained within the pelvis, or extends up from beneath the peritonæum, and into the iliac fossæ. In the other, it attacks that portion of the peritonæum which covers the pelvic viscera, and is limited to it.

So much is admitted by all writers, but great obscurity in description, and consequent difficulty in understanding satisfactorily the nature of these affections, have resulted from the variety of nomenclature which different authors have adopted.

Thus the former disease has been variously described as pelvic cellulitis, peri-uterine phlegmon, para-metritis, or pelvic abscess, while the latter is not unfrequently called peri-metritis, as contradistinguished from para-metritis. The use of the prefix *para* or

¹ Trousseau, Clinique de l'Hôtel-Dieu in Gaz. des Hop., 1860, p. 577.

peri, to distinguish the cellular or peritoneal variety of inflammation, originally suggested by Virchow, has been pretty generally adopted in Germany, and has been strongly advocated in this country by Matthews Duncan. It has never, however, found much favor with English writers, and the similarity of the two names is so great as to lead to confusion. I have, therefore, selected the terms "*pelvic peritonitis*," and "*pelvic cellulitis*," as conveying in themselves a fairly accurate notion of the tissues mainly involved.

Importance of Distinguishing the Two Classes of Cases.—The important fact to remember is that there exist two distinct varieties of inflammatory disease, presenting many similarities in their course, symptoms, and results, often occurring simultaneously, but in the main distinct in their pathology, and capable of being differentiated. Thomas compares them—and, as serving to fix the facts on the memory, the illustration is a good one—to pleurisy and pneumonia. "Like them," he says, "they are separate and distinct, like them affect different kinds of structure, and like them they generally complicate each other." It might, therefore, be advisable, as most writers on the disease occurring in the non-puerperal state have done, to treat of them in two separate chapters. There is, however, more difficulty in distinguishing them as puerperal than as non-puerperal affections, for which reason, as well as for the sake of brevity, I think it better to consider them together, pointing out, as I proceed, the distinctive peculiarities of each.

Seat of Disease.—When attention was first directed to this class of diseases, the pelvic cellular tissue was believed to be the only structure affected. This was the view maintained by Nonat, Simpson, and many modern writers. Attention was first prominently directed to the importance of localized inflammation of the peritonæum, and to the fact that many of the supposed cases of cellulitis were really peritonic, by Bernutz. There can be no doubt that he here made an enormous step in advance. Like many authors, however, he rode his hobby a little too hard, and he erred in denying the occurrence of cellulitis in many cases in which it undoubtedly exists.

Etiology.—The great influence of child-birth in producing these diseases has long been fully recognized. Courty estimates that about two-thirds of all the cases met with occur in connection with delivery or abortion, and Duncan found that out of 40 carefully observed cases, 25 were associated with the puerperal state.

The Inflammation is Secondary and never Idiopathic.—It is pretty generally admitted by most modern writers that both varieties of the disease are produced by the extension of inflammation from either the uterus, the Fallopian tubes, or the ovaries. This point has been especially insisted on by Duncan, who maintains that the disease is never idiopathic, and is "invariably secondary either to mechanical injury, or to the extension of inflammation of some of the pelvic viscera, or to the irritation of the noxious discharges through or from the tubes or ovaries."

Often intimately connected with Septicæmia.—Their intimate connection with puerperal septicæmia is also a prominent fact in the natural history of the diseases. Barker mentions a curious observation illustrative of this, that when puerperal fever is endemic in the Bellevue Hospital in New York, cases of pelvic peritonitis and cellulitis are also invariable met with. Olshausen has also remarked that in the Lying-in Hospital at Halle, during the autumn vacation, when the patients are not attended by practitioners, and when, therefore, the chance of septic infection being conveyed to them is less, these inflammations are almost always absent. As inflammation of the lining membrane of the uterus, of the vaginal mucous membrane, and of the pelvic connective tissue, are of very constant occurrence as local phenomena of septic absorption, the connection between the two classes of cases is readily susceptible of explanation. Schroeder, indeed, goes further, and includes his description of these diseases under the head of puerperal fever. They do not, however, necessarily depend upon it; for, although it must be admitted that cases of this kind form a large proportion of those met with, others unquestionably occur which cannot be traced to such sources, but are the direct result of causes altogether unconnected with the inflammation attending on septic absorption, such as undue exertion shortly after delivery, or premature coition. Mechanical causes may beyond doubt excite the disease in a woman predisposed by the puerperal process, but they cannot fairly be included under the head of puerperal fever.

Seat of the Inflammation in Pelvic Cellulitis.—Abundance of areolar tissue exists in connection with the pelvic viscera, which may be the seat of cellulitis. It forms a loose padding between the organs contained in the pelvis proper, surrounds the vagina, the rectum, and the bladder, and is found in considerable quantity between the folds of the broad ligaments. From these parts it extends upwards to the iliac fossæ, and the inner surface of the abdominal parietes. In any of these positions it may be the seat of the kind of inflammation we are discussing. The essential character of the inflam-

mation is similar to that which accompanies areolar inflammation in other parts of the body. There is first an acute inflammatory œdema, followed by the infiltration of the areolæ of the connective tissue with exudation, and the consequent formation of appreciable swellings. These may form in any part of the pelvis. Thus we may meet with them, and this is a very common situation, between the folds of the broad ligaments, forming distinct hard tumors, connected with the uterus, and extending to the pelvic walls, their rounded outlines being readily made out by bi-manual examination. If the cellulitis be limited in extent, such a swelling may exist on one side of the uterus only, forming a rounded mass of varying size, and apparently attached to it. At other times the exudation is more extensive, and may completely or partially surround the uterus, extending to the cellular tissue between the vagina and rectum, or between the uterus and the bladder. In such cases the uterus is imbedded and firmly fixed in dense hard exudation. At other times, the inflammation chiefly affects the cellular tissue covering the muscles lining the iliac fossæ. There it forms a mass, easily made out by palpation, but on vaginal examination little or no trace of the exudation can be felt, or only a sense of thickness at the roof of the vagina on the same side as the swelling.

Seat of the Inflammation in Pelvic Peritonitis.—In pelvic peritonitis the inflammation is limited to that portion of the peritonæum which invests the pelvic viscera. Its extent necessarily varies with the intensity and duration of the attack. In some cases there may be little more than irritation, while more often it runs on to exudation of plastic material. The result is generally complete fixation of the uterus and hardening and swelling in the roof of the vagina, and the lymph poured out may mat together the surrounding viscera so as to form swellings, difficult, in some cases, to differentiate from those resulting from cellulitis. On post-mortem examination, the pelvic viscera are found extensively adherent, and the agglutination may involve the coils of the intestine in the vicinity, so as sometimes to form tumors of considerable size.

Relative Frequency of the Two Forms of Disease.—The relative frequency of these two forms of inflammation as puerperal affections is not easy to ascertain. In the non-puerperal state the peritonitic variety is much the more common, but in the puerperal state they very generally complicate each other, and it is rare for cellulitis to exist to any great extent without more or less peritonitis.

Symptomatology.—The earliest symptom is pain in the lower part of the abdomen, which is generally preceded by rigor or chilliness. The amount of pain varies much. Sometimes it is comparatively slight, and it is by no means rare to meet with patients who are the subjects of very considerable exudations, who suffer little more than a certain sense of weight and discomfort at the lower part of the abdomen. On the other hand, the suffering may be excessive, and is characterized by paroxysmal exacerbations, the patient being comparatively free from pain for several successive hours, and then having attacks of the most acute agony. Schroeder says that pain is always a symptom of peritonitis, and that it does not exist in uncomplicated cellulitis. The swellings of cellulitis are certainly sometimes remarkably free from tenderness, and I have often seen masses of exudation in the iliac fossæ which could bear even rough handling. On the other hand, although this is certainly more often met with in non-puerperal cases, the tenderness over the abdomen is sometimes excessive, the patient shrinking from the slightest touch. The pulse is raised, generally from 100 to 120, and the thermometer shows the presence of pyrexia. During the entire course of the disease both these symptoms continue. The temperature is often very high, but more frequently it varies from 100° to 104°, and it generally shows more or less marked remissions. In some cases the temperature is said not to be elevated at all, or even to be subnormal, but this is certainly quite exceptional. Other signs of local and general irritation often exist. Among them, and most distinctly in cases of peritonitis, are nausea and vomiting, and an anxious, pinched expression of the countenance, while the local mischief often causes distressing dysuria and tenesmus. The latter is especially apt to occur when there is exudation between the rectum and vagina, which presses on the bowel. The passage of feces, unless in a very liquid form, may then cause intolerable suffering.

Such symptoms may show themselves within a few days after delivery, and then they can barely fail to attract attention. On the other hand, they may not commence for some weeks after labor, and then they are often insidious in their onset, and apt to be overlooked. It is far from rare to meet with cases six weeks or more after confinement in which the patient complains of little beyond a feeling of malaise and discomfort, and in which, on investigation, a considerable amount of exudation is detected, which had previously entirely escaped observation.

Results of Physical Examination.—On introducing the finger into the vagina, it will be found to be hot and swollen, in some cases distinctly œdematous, and on reaching the vaginal cul-de-sac the existence of exudation may generally be made out. The

amount of this varies much. Sometimes, especially in the early stage of the disease, there is little more than a diffuse sense of thickness and induration at either side of or behind the uterus. More generally careful bi-manual examination enables us to detect a distinct hardening and swelling, possibly a tumor of considerable size, which may apparently be attached to the sides of the uterus, and rise above the pelvic brim, or may extend quite to the pelvic walls. The examination should be very carefully and systematically conducted with both hands, so as to explore the whole contour of the uterus before, behind, and on either side, as well as the iliac fossæ; otherwise a considerable exudation might readily escape detection. When the exudation is at all great, more or less fixity of the uterus is sure to exist, and is a very characteristic symptom. The womb, instead of being freely movable by the examining finger, is firmly fixed by the surrounding exudation, and in severe forms of the disease is quite encased in it. More or less displacement of the organ is also of common occurrence. If the swelling be limited to one side of the pelvis or to Douglas's space, the uterus is displaced in the opposite direction, so that it is no longer in its usual central position.

The Two Forms of Disease cannot always be Distinguished.—The differential diagnosis of pelvic cellulitis and pelvic peritonitis cannot always be made, and, indeed, in many cases it is impossible, since both varieties of disease coexist. The elements of differentiation generally insisted on are, the greater general disturbance, nausea, etc., in pelvic peritonitis, with an earlier commencement of the symptoms after labor. The swellings of pelvic peritonitis are also more tender, with less clearly defined outline than those of cellulitis. When the cellulitis involves the iliac fossa the diagnosis is, of course, easy, and then a continuous retraction of the thigh on the affected side (an involuntary position assumed with the view of keeping the muscles lining the iliac fossa at rest) is often observed. When the inflammation is chiefly limited to the cavity of the pelvis, the distinction between the two classes of cases cannot be made with any degree of certainty.

Terminations.—Both forms of disease may end either in resolution or in suppuration. In the former case, after the acute symptoms have existed for a variable time, it may be for a few days only, it may be for many weeks, their severity abates, the swellings become less tender and commence to contract, become harder, and are gradually absorbed; until, at last, the fixity of the uterus disappears, and it again resumes its central position in the pelvic cavity. This process is often very gradual. It is by no means rare to find a patient, even some months after the attack, when all acute symptoms have long disappeared, who is even able to move about without inconvenience, in whom the uterus is still immovably fixed in a mass of deposit, or is, at least adherent in some part of its contour. More or less permanent adhesions are of common occurrence, and give rise to symptoms of considerable obscurity, which are often not traced to their proper source.

Symptoms of Suppuration.—When the inflammation is about to terminate in suppuration, the pyrexial symptoms continue, and eventually well-marked hectic is developed, the temperature generally showing a distinct exacerbation at night. At the same time rigors, loss of appetite, a peculiar yellowish discoloration of the face, and other signs of suppuration, show themselves. The relative frequency of this termination is variously estimated by authors. Duncan quotes Simpson as calculating it as occurring in half the cases of pelvic cellulitis, but states his own belief that it is much more frequent. West observed it in 23 out of 43 cases following delivery or abortion, and McClintock in 37 out of 70. Schroeder says that he has only once seen suppuration in 92 cases of distinctly demonstrable exudation, a result which is certainly totally opposed to common experience. Barker also states that in his experience suppuration in either pelvic peritonitis or cellulitis "is very rare, except when they are associated with pyæmia or puerperal fever." It is certain that suppuration is more likely to occur in pelvic cellulitis than in pelvic peritonitis, but it unquestionably occurs, in this country at least, much more frequently than the statements of either of these authors would lead us to suppose.

Channels through which Pus may Escape.—The pus may find an exit through various channels. In pelvic cellulitis, more especially when the areolar tissue of the iliac fossa is implicated, the most common site of exit is through the abdominal wall. It may, however, open at other positions, and the pus may find its way through the cellular tissue and point at the site of the anus, or in the vagina, or it may take even a more tortuous course and reach the inner surface of the thigh. Pelvic abscesses not uncommonly open into the rectum or bladder, causing very considerable distress from tenesmus or dysuria. According to Hervieux, it is chiefly the peritoneal varieties which open in this way. Not unfrequently more than one opening is formed; and when the pus has burrowed for any distance, long fistulous tracts result, which secrete pus for a length

of time, and are very slow to heal. Rupture of an abscess into the peritoneal cavity, especially of a peritonitic abscess, is a possible (but fortunately a very rare) termination, and will generally prove fatal by producing general peritonitis. In one case which I have recorded in the fifteenth volume of the *Obstetrical Transactions*, suppuration was followed by extensive necrosis of the pelvic bones. Two similar cases are related by Trousseau in his *Clinical Medicine*, but I have not been able to meet with any other examples of this rare complication, which was probably rather the result of some obscure septicaemic condition than of extension of the inflammation.

Prognosis.—The prognosis is favorable as regards ultimate recovery, but there is great risk of a protracted illness which may seriously impair the health of the patient, especially if suppuration result. Hence it is necessary to be guarded in an expression of opinion as to the consequences of the disease. Secondary mischief is also far from unlikely to follow, from the physical changes produced by the exudation, such as permanent adhesions or malpositions of the uterus, or organic alterations in the ovaries or Fallopian tubes.

Treatment.—In the treatment of both forms of disease the important points to bear in mind are the relief of pain, and the necessity of absolute rest; and to these objects all our measures must be subordinate, since it is quite hopeless to attempt to cut short the inflammation by any active medication.

If the disease be recognized at a very early stage, the local abstraction of blood, by the application of a few leeches to the groin or to the hæmorrhoidal veins, may give relief; but the influence of this remedy has been greatly exaggerated, and when the disease is of any standing it is quite useless. Leeches to the uterus, often recommended, are, I believe, likely to do more harm than good (unless in very skilful hands), from the irritation produced by passing the speculum. Opiates in large doses may be said to be our sheet-anchor in treatment whenever the pain is at all severe, either by the mouth, in the form of morphia suppositories, or injected subcutaneously. In the not uncommon cases in which pain comes on severely in paroxysms, the opiates should be administered in sufficient quantity to lull the pain, and it is a good plan to give the nurse a supply of morphia suppositories (which often act better than any other form of administering the drug), with directions to use them immediately the pain threatens to come on. When there is much pyrexia large doses of quinine may be given with great advantage, along with the opiates. The state of the bowels requires careful attention. The opiates are apt to produce constipation, and the passage of hardened fæces causes much suffering. Hence it is desirable to keep the bowels freely open. Nothing answers this purpose so well as small doses of castor oil, such as half a teaspoonful given every morning. Warmth and moisture, constantly applied to the lower part of the abdomen, give great relief either in the form of large poultices of linseed meal, or, if these prove too heavy, of spongio-piline soaked in boiling water. The poultices may be advantageously sprinkled with laudanum or belladonna liniment. I say nothing of the use of mercurials, iodide of potassium, and other so-called absorbent remedies, since I believe them to be quite valueless, and apt to divert attention from more useful plans of treatment.

Importance of Rest.—The most absolute rest in the recumbent position is essential, and it should be persevered in for some time after the intensity of the symptoms is lessened. The beneficial effect of rest in alleviating pain is often seen in neglected cases, the nature of which has been overlooked, instant relief following the laying up of the patient.

Counter-irritation.—When the acute symptoms have lessened absorption of the exudation may be favored, and considerable relief obtained, from counter-irritation, which should be gentle and long-continued. The daily use of tincture of iodine until the skin peels, perhaps best meets this indication; but frequently repeated blisters are often very serviceable. This I believe to be a better plan than keeping up an open sore with savine ointment, or similar irritating applications.

Opening of Pelvic Abscesses.—When suppuration is established the question of opening the abscess arises. When this points in the groin, and the matter is superficial, a free incision may be made, and here, as in mammary abscess, the antiseptic treatment is likely to prove very serviceable. The abscess should, however, not be opened too soon, and it is better to wait until the pus is near the surface. The importance of not being in too great a hurry to open pelvic abscesses has been insisted on by West, Duncan, and other writers, and I have no doubt the rule is a good one. It is more especially applicable when the abscess is pointing in the vagina or rectum, where exploratory incisions are apt to be dangerous, and when the presence of pus should be positively ascertained before operating. We have in the aspirator a most useful instrument in the treatment of such cases, which enables us to remove the

greater part of the pus without any risk, and the use of which is not attended with danger even if employed prematurely. If it do not sufficiently evacuate the abscess, a free opening can afterwards be safely made with the bistoury. The surgical treatment of pelvic abscess is, however, too wide a subject to admit of being satisfactorily treated here.

Diet and Regimen.—The diet should be abundant but simple and nutritious. In the early stages of the disease, milk, beef-tea, eggs, and the like will be sufficient. After suppuration a large quantity of animal food is required, and a sufficient amount of stimulants. The drain on the system is then often very great, and the amount of nourishment patients will require and assimilate, when a copious purulent discharge is going on, is often quite remarkable. A general tonic plan of medication will also be required, and such drugs as iron, quinine, and cod-liver oil, will prove useful.

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